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Particulate Source Apportionment Analysis Using the Chemical Mass Balance Receptor Model

VOLUME II

APPENDICES

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Particulate Source Apportionment Analysis Using the Chemical Mass Balance Receptor Model

VOLUME II

APPENDICES

Prepared for

Department of Health and Environmental Sciences
State of Montana

By

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September, 1982

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- Standard Operating Procedure

Ambient Air Sampling with Sierra Low-Volume Dichotomous Sampler

1. Low-Volume Dichotomous Sampling Schedule

[See Study Specific Details]

2. Equipment

   1. Sierra Instruments, Inc., Model 244 Dichotomous Sampler
   2. Sierra Model FH-240-P Polypropylene Filter Cassette
   3. Sample Transport Boxes (STB)

3. Loading Unexposed Samples

   1. Each filter is preloaded in a filter cassette and stored in a plastic petri dish. The sample ID# is written on the outer edge of the filter itself and on a label affixed to the petri dish. The samples are transported to and from the sampling site in a STB.
   2. Record sampling site, sampler serial #, date sample is loaded, sampling date, and operator's initials on Low-Volume Dichotomous Field Data Sheet.
   3. Select a pair (one coarse and one fine) of samples and record their ID #'s.

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4. On the sampling module, the coarse-particle sample holder has the larger embossing on the knurled nut, and is directly in line with the aerosol inlet. The fine-particle sample holder assembly has finer embossing on the knurled nut and is offset from the center line of the aerosol inlet. Holding the lower half of the sample holder assembly, unscrew the knurled nut of the coarse-particle sample holder assembly.
5. Make sure the "O" ring and teflon gasket surfaces which seal the filter holder are clean and free of particulate matter. Do not touch the filter screen.
6. Remove the coarse filter cassette and filter from its petri dish being careful not to touch the filter surface. Place directly on the filter screen. The side of the filter cassette having the shortest distance (about 1 mm) to the filter surface goes down. This step should be done so as to prevent any precipitation from landing on the filter.
7. Lift sample holder assembly to assembled position and screw on knurled nut as tight as possible by hand.
8. Repeat steps 4-7 for fine-particle sample.
9. Open Control Module door and turn SAMPLER switch ON. Adjust TOTAL FLOW to 16.7 SLPM at center of ball. The vacuum gauge should read less than 5 Hg. Adjust COARSE PARTICLE FLOW to 1.67 SLPM at center of ball. The vacuum gauge should read about zero. Turn SAMPLER switch to TIMED.

10. Check that SAMPLE START TIME and TIME OF DAY are properly set. If not, set as in section 5.4 and 5.5 Return DISPLAY switch to OFF.
11. Record TOTAL SAMPLING TIME on Dichotomous Field Data Sheet. Close Control Module door.
12. Record any extraordinary conditions that apply to sample in comments column.

4. Unloading Exposed Samples

1. Record unloading date and operator's initials if different than when sample was loaded.
2. Record TOTAL SAMPLING TIME. If sampler does not have PRESSURE switch, final flows must be checked. To do this, switch SAMPLER to ON, record flows in comments column, then switch SAMPLER to TIMED.
3. Turn DISPLAY switch to TIME OF DAY. If display flashes, AC and battery power both have failed and timer must be reprogrammed (see section 5). Check that AC POWER FAIL light is not on. If it is, record in comments column and reset TIMER (section 5). Return DISPLAY switch to OFF.
4. Select petri dish with coarse-particle filter ID # of exposed sample.
5. Holding the lower half of the sample holder assembly unscrew knurled nut for coarse-particle sample holder assembly. Remove filter cassette and filter, being careful not to touch the filter surface, and place in petri dish. This step should be done so as to keep precipitation from falling on sample or filter screen. Replace sample holder assembly in assembled position unless more samples are to be loaded.

6. Repeat steps 4 and 5 for fine-particle sample.

7. Record any extraordinary conditions that apply to sample in comments column.

8. Exposed samples should be kept upright and handled with the minimum vibration possible.

5. Programming TIMER

1. Open Control Module Door.

2. Turn SAMPLER switch OFF.

3. Push POWER switch ON.

4. Set SAMPLE START TIME (digits will flash until set)

   a. Set DISPLAY switch to SAMPLE START TIME.

   b. Hold FAST/SLOW switch to get 00 hours, 00 mins.

   c. Set DISPLAY switch to OFF.

5. Set TIME OF DAY (digits will flash until set)

   a. Set DISPLAY switch to TIME OF DAY.

   b. Hold FAST/SLOW switch to get current time of day (24 hour format).

   c. Set DISPLAY switch to OFF.

6. Set SAMPLE AFTER 0-8 days switch to the number of full days to be skipped before the first sample.

7. Set SAMPLE EVERY 1-9 DAYS to the desired position.

8. Set SAMPLE FOR 1-24 HOURS to 24.

   Note: The switches set in steps 6-8 are positive detent switches. Make sure they are in proper detent.

9. Hold SET switch to TIMER for about 2 seconds. TIMER is now programmed.

.6. Auxilliary Controls

Set BATTERY switch and PRESSURE switch to ON.

LOW-VOLUME DICHOTOMOUS FIELD DATA SHEET

Site	Sampler Serial#	Filter ID#	Date Sampled	Flow Rate (1/min)		Time Totalizer (hrs)			Initials	Volume (m^3)	Comments
				Start	Stop	Start	Stop	Net			
		F								F	
		C								C	

Standard Operating Procedure

Ambient Air Sampling with
NEA Low-Volume TSP Sampler

1. Low-Volume TSP Sampling Schedule

[See Study Specific Details]

2. Equipment

1. NEA low-volume TSP Samplers contain the following:

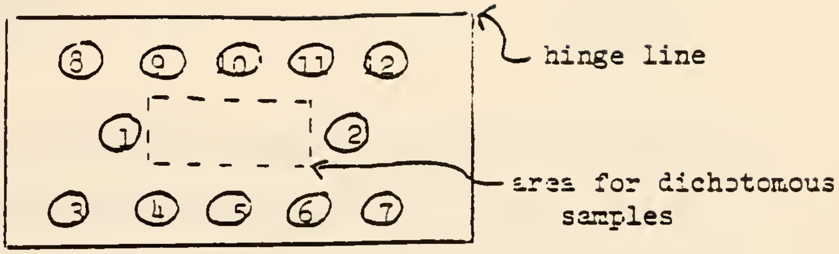
    a. Gast model 1022-V2-G272X rotary vane vacuum pump
    b. AMF Paragon model 7008-0 time switch
    c. Vacuum gauge, 0-30 inches Hg.
    d. Needle valves
    e. Sampling standpipe
    f. Quick disconnect (QD) filter holding fitting
    g. Miscellaneous plumbing and electrical parts and connections
    h. Plywood housing

    Note: Sampler may be wired so that hi-vol time switch controls the low-vol TSP Sampler. In this case, set hi-vol time switch to control sampler and keep low-vol time switch ON.

2. Sample Transport Boxes (STB)

    The boxes contain quick disconnect (QD) fittings for twelve samples.

    The samples are place in the box in order of increasing numerical value according to the pattern shown.



3. Filter Holders

   The filter holder consists of base with QD compatible fitting, filter support grid, "O" ring, and screw cap. Do not attempt to rotate the filter holder by turning the screw cap when the filter holder is mounted in a QD fitting, as the screw cap may loosen and allow air leakage past the filter.

4. Rain Hat

   Rain hats keep precipitation and debris from landing on the sample. They are a friction fit over the filter holders.

3. Loading Unexposed Samples

   1. The samples are transported to the sampling site in a STB. Each filter holder is wrapped in a plastic baggie to prevent contamination of the sample and a plastic cap to provide mechanical protection. Place STB on sampler housing.
   2. Record sampling site, sampler serial #, date sample is loaded, sampling date, and operator's initials on Low-Volume TSP Field Data Sheet.
   3. Remove next sample in sequence from STB by pressing down on QD locking ring, then lifting up on sample holder.
   4. Record sample ID# as indicated by label on filter holder base.

5. Load sample by pressing down on sampling standpipe QD locking ring and pushing filter holder into position. Check to make sure sample is properly locked into QD by trying to pull filter holder up and out of QD.

6. Remove protective cap and place in STB. Remove plastic baggie and discard. Place Rain Hat on filter holder and press down as far as it will go. This step should be done so as to prevent any precipitation from landing on filter.

7. Open sampler housing door and timer switch door. Remove plug from vacuum gauge port and install vacuum gauge. Turn pump ON by throwing timer switch to "ON" position. Read vacuum on gauge; it may be necessary to hold gauge to damp out vibration so that needle is steady. Read vacuum to nearest 1/4 division and record. Turn pump OFF by throwing timer switch to "OFF". Remove vacuum gauge and install plug in vacuum gauge port.

8. Set time by rotating time dial so that sample will start at proper time and day. Close timer door.

9. Check that oil reservoir is at least 1/4 full. If not, fill (see Maintenance for Low-Volume TSP Samplers).

10. Note any extraordinary conditions that apply to sample in comments column. Use more than one line for comments if necessary.

4. Unloading Exposed Samples

1. Place STB on top of sampler housing. Open sampler housing and timer switch doors. Record date sample is unloaded, and operator's

initial if different than when sample was loaded. Verify that timer shows proper day and time. If not, indicate in comments column.

2. Remove plug from vacuum gauge port and install vacuum gauge. Turn pump ON by throwing timer switch to "ON". Read vacuum on Gauge; it may be necessary to hold gauge to damp out vibration so that needle is steady. Read vacuum to nearest 1/4 division and record. Turn pump OFF by throwing switch to "OFF". Remove vacuum gauge and install plug in vacuum gauge port. Close timer door.
3. Remove Rain Hat and cover exposed filter with a clean baggie and protective cap. Open lid of STB and place Rain Hat in lid. This step should be done so as to prevent any precipitation from landing on filter.
4. Remove exposed sample by pressing down on QD locking ring and lifting filter holder from QD fitting. Sample should be kept upright at all times.
5. Replace sample in STB in its proper sequential position by pushing down on QD locking ring and pressing filter holder into position. Check to make sure sample is properly locked into QD by trying to pull filter holder up and out of QD.
6. Close sampler door.
7. Record any extraordinary conditions that apply to sample in comments column.
8. Exposed samples should be kept upright and handled with the minimum vibration possible.

STANDARD OPERATING PROCEDURE

AMBIENT FILTER HANDLING AND STORAGE

1. General Discussion

Filters used for ambient particulate collection consist of a polyolefin supporting ring bonded to the top (particle collection) surface of a teflon membrane. Two sizes, 47 and 37 mm diameter, are used for TSP and dichotomous samples, respectively.

Sample ID codes have a two-letter prefix: HD for coarse dichotomous and HT for TSP. A three-digit number follows the prefix; both sample types are numbered starting at 001.

All filter handling procedures are to be done in a clean area. Clean the work area with a methanol dampened Kaydry towel, then lay out a clean Kaydry towel to use as a work surface before all handling procedures. The filters must be handled only by the supporting ring with clean forceps.

Filters are stored in individual Petri slides, which in turn are placed in numerical order in plastic trays. Cardboard boxes each holding two Petri slide trays are placed in the sample storage cabinet to insure secure storage.

2. Materials and Equipment

- Nulcepore aerosol filter holders with quick-disconnect fittings
- Sierra Model FH-240-P filter cassettes
- Millipore 49 x 9 mm plastic Petri dishes
- Millipore 47 mm Petri slides and trays
- Ghia Corp. Tefla filters, 47 and 37 mm diameter
- Sample transport boxes for both sample types
- forceps
- Kaydry towels
- methanol
- Baggies
- waterproof fine point marker
- 2-3/8" Caplugs
- adhesive labels
- Nuclepore 47 mm drain disks
- Ziploc bags

3. Filter Coding

1. Lay out a series of 5 - 10 Petri slides on the work surface, label with the next sample ID numbers in sequence and remove their lids.

2. Select a new filter and inspect both sides for foreign particles, pin holes, discolorations, or other imperfections. Some particles may be carefully blown off. Discard the filter if defective. Otherwise, place top side up in an open Petri slide.

3. Repeat step 2 until all Petri slides contain a filter.

4. Steady the filter in the Petri slide by pressing down on the plastic ring of the filter with forceps. Write the ID number as recorded on the Petri slide on the plastic ring of the filter using a fine point waterproof marker.

5. Repeat step 4 until all filters are coded with an ID number.

6. Check that the ID numbers on the filters correspond to those on the Petri slides, wait a few seconds for the ink to dry, then replace the Petri slide lids.

7. Return the coded filters and Petri slides to the tray in numerical order.

8. Repeat steps 1 - 7 as necessary.

9. Record the lot number and pore size of all filters coded in the Kellogg Sample Log Book.

10. Place loaded trays in boxes and store in sample storage cabinet.

4. Loading - Dichotomous Samples

1. Obtain filters to be loaded from the sample storage cabinet.

2. Select a tared filter from the sample tray and place Petri slide on work surface. Write the ID number on an adhesive label using a waterproof marking pen and stick to the lid (the portion without the embossed marking) of a clean 49 x 9 mm Petri dish. Check that the ID number on the filter, the Petri slide, and the Petri dish match.

3. Place the bottom half (female part) of a clean Sierra filter cassette on the work surface and transfer the filter from its Petri slide to the filter cassette. It should be placed top side up. Place the top half (male part) of a clean Sierra filter cassette in position over the bottom half and press down so that it snaps into proper alignment.

4. Transfer the loaded filter cassette into the labeled Petri dish top side up and set aside.

5. Return the empty Petri slide to its place in the tray.

6. Repeat steps 2 - 5 as necessary.

7. Return trays to boxes and sample storage cabinet.

8. Continue with shipping procedure.

5. Loading - TSP Samples

1. Obtain filters to be loaded from the sample storage cabinet.

2. Select a tared filter from the sample tray and place Petri slide on work surface. Write the ID number on an adhesive label using a waterproof marking pen and stick on the base of a clean Nuclepore filter holder. Check that the ID number on the filter, the Petri slide, and the filter holder base match.

3. Using the forceps place a single drain disk on the filter holder base. Transfer the filter from its Petri slide into position (top side up) on the drain disk. Place a clean locking ring into position, making sure proper alignment of filter holder base, drain disk, filter and locking ring is achieved. Screw the top tightly into position, being careful not to distrub alignment. Place a clean Baggie over the filter holder and a Caplug on top.

4. Place the loaded filter into the sample transport box.

5. Return the empty Petri slide to its place in the tray.

6. Repeat steps 2 - 5 as necessary.

7. Return trays to boxes and sample storage cabinet.

8. Continue with shipping procedure.

6. Unloading - Dichotomous Samples

1. Check that samples have been logged in according to the Sample Shipping Procedure. Obtain Petri slide trays from sample storage cabinet.

2. Select a Petri dish containing an exposed filter from the sample transport box and place on work surface. Obtain the Petri slide with matching ID number from the tray and place on work surface.

3. Remove the Petri dish lid and, being careful not to touch the filter, use a pair of forceps to remove the filter cassette assembly from the petri dish. Carefully separate the cassette assembly by sliding thumbnail between the top and bottom and prying apart. Then using a second pair of forceps, transfer the filter to its Petri slide.

4. Make sure the ID number on the filter matches the others. Return the Petri slide and filter to its place in the tray.

5. Record any unusual appearance or condition of the filter in the East Helena Sample Log Book.

6. Repeat steps 2 - 5 until filters are all unloaded.

7. Return trays to boxes and sample storage cabinet.

7. Unloading - TSP Samples

This Section is the same as Section 6.6, except for steps 2 and 3:

2. Select a sample from the sample transport box and set upright on the work surface. Obtain the Petri slide with matching ID number from the tray and place on work surface.

3. Remove Caplug. Remove Baggie and discard. Unscrew top and lift off locking ring, being careful not to touch the filter. Transfer the filter to its Petri slide.

8. Equipment Cleaning

1. After sample unloading, clean the sample transport boxes using a methanol dampened Kaydry towel. Clean both inside and outside surfaces.

2. Remove drain disks and adhesive labels from filter holders and Petri dishes. Clean all parts (filter holder base, locking ring, screw top, Caplug, filter cassette and Petri dish) with a methanol dampened Kaydry towel. Pay particular attention to surfaces that contact the filter, and do not touch those surfaces after cleaning.

3. Place cleaned filter holder bases, screw tops, and Caplugs in sample transport box.

4. Place cleaned locking rings, filter cassettes, and Petri dishes in Ziploc bags.

Standard Operating Procedure

Low-Volume TSP and Dichotomous Sample Shipping

1. General Discussion

Unexposed samples are shipped from NEA Laboratories to the State of Montana. The exposed samples are returned to NEA Laboratories for analysis. Shipping procedures are designed to preserve the integrity of the samples. The TSP filters are preloaded into Nuclepore filter holders and protected with a plastic bag and cap. The dichotomous filters are preloaded into filter holder cassettes and then put into plastic petri dishes. The samples are then securely placed in a Sample Transport Box.

2. Equipment

1. TSP Sample Transport Box. Holds 12 TSP samples.
2. Dichotomous Sample Transport Box. Holds 36 dichotomous samples.
3. TSP filter holders.
4. Dichotomous filter cassettes and petri dishes.
5. Plywood shipping box with flanged base.
6. Tip (N) Tell indicators.

3. Transfer Logistics

The following diagram shows the various stages of sample transfer logistics.

	NEA	In Transit	Montana State	
1.		U	U	E
2.		E	U	U
3.	E		U	E/U
4.	U		U	E/U

U = Inexposed

E = Exposed

E/U = Part Exposed Part Unexposed

4. Shipping Unexposed Samples to Montana State
    1. Load unexposed samples into Sample Trasport Boxes. Record date in East Helena Sample Log Book.
    2. Pack Sample Transport Boxes into cardboard shipping box, tape shut and affix proper address label.
    3. Call local shipping agent and tell them we have a pick-up for them. When samples are picked up, sign initials next to date recorded in Step 1.
5. Return Shipping of Exposed Samples
    1. Record sample ID #'s and date.
    2. Pack the full Sample Transport Boxes into plywood shipping box, enclose Field Data Sheets, tape box shut, and affix proper address label.
    3. Place Tip-N-Tell indicator on side of box and remove wire.
    4. Fill out bill of lading form, call local shipping agent (UPS) and tell them you have a pick-up for them.
    5. When package arrives at NEA Labs, record date, sign initials, and record condition of Tip-N-Tell indicator in East Helena Log Book.

STANDARD OPERATING PROCEDURE

BULK GEOLOGICAL AND SOIL DUST SAMPLING

1. General Discussion

The objective of the soil sampling is to obtain reapresentative samples of the dust likely to be entrained from various area sources that have a substantial (> ½ inch) layer of material. Criteria used to determine sampling locations include proximity to ambient sampling sites, accessibility, potential contribution to the ambient aerosol, lead concentration, and a desire to obtain a representation of a variety of soil dust types. Results of several past studies are used to aid the selection of sampling locations.

2. Materials and Equipment

- Ziploc bags
- Large spatula
- Kaydry towels

3. Sample Collection

1. Clean the spatula with a Kaydry towel. Loosen the top layer (about ½ - 1 inch) of soil with the spatula.
2. Using the spatula, transfer the loosened material to a new Ziploc bag, filling it about ½ full. Seal the bag.
3. Record your initials, the date, sample ID number, the location description, and other comments on the data sheet.
4. Place the bagged sample and data sheet inside another Ziploc bag and seal.
5. Hand carry the samples back to the laboratory, log them in, and place in sample storage cabinet.

BULK SOURCE SAMPLE

Date________________________Initial____________________Sample I.D.____________________

Location____

____

Comments____

____

STANDARD OPERATING PROCEDURE

ROAD DUST SAMPLING

1. General Discussion

The objective of the road dust sampling is to obtain representative samples of the road dust likely to be entrained in the ambient aerosol. This procedure also includes unpaved sources that have a minimum dust layer.
Criteria for sample location selection include proximity to ambient sampling sites, accessibility, potential contribution to the ambient aerosol, past studies, and a desire to obtain a representation of a variety of road dust types.

2. Materials and Equipment

- Road Dust Sampler - consisting of an enclosed hivol motor and filter holder fitted with an adapter cone, hose, brush and shoulder strap
- Glass fiber filters, 8 x 10 inches
- Portable generator or other 115 VAC, 8A, 50/60 hz power source
- Extension cord, 25 feet
- Ziploc bags
- Envelopes, about 7 x 10 inches

3. Sample Collection

1. Clean the hose, brush, adapter cone and filter hold down frame with the stream of exhaust air from the hivol motor. Disassemble the hose sections and shake the flexible portion of the hose to help dislodge any dust in the system.

2. Place a clean filter on the wire mesh filter holder. Install the filter hold down frame, being careful to center the filter. Mount the adapter cone and tighten wing nuts moderately tight. Assemble the hose sections and brush.

3. Carry the sampler with shoulder strap, keeping the filter horizontal during sampling and until after the sample is unloaded.

4. Start sampler and vacuum the road from the centerline to the edge of the normal traffic flow. Vacuum a section of road large enough to collect a layer of material about 1/8 to 1/2 inch thick. If not sampling a paved road, vacuum a representative portion of the source area.

5. Shut the sampler off and position for filter unloading. If the wind is blowing, it may be necessary to find a relatively calm area.

6. Unscrew the wing nuts and remove the adapter cone and filter hold down frame. Carefully fold filter into forths, first lengthwise, then widthwise, so that none of the sample falls off the filter. Place folded filter into a Ziploc bag and seal.

7. Record project, date, sample ID number, initials, sampling location and other comments on the data sheet. Record project, date, sample ID number and initials on an envelope, place bagged sample and data sheet into the envelope and seal.

8. Hand carry the samples back to the laboratory, log them in, and place in the sample storage cabinet.

ROAD DUST SOURCE SAMPLE

Project______________________Date______________Sample ID_____________Initial_______

Location____

Comments____

Standard Operating Procedure

Soil and Bulk Material Sample Drying

1. Discussion

The main objective is to obtain contamination free samples dried at less than 100°C. Major potential problems are:

1. Mixing up sample identifications.
2. Contaminating samples.
3. Heating at temperatures greater than 100°C.
4. Losing highly volatile components from certain industrial bulk samples.

2. Materials and Equipment

1. Blue M Laboratory Oven, Model SW-17TA
2. Glass beakers, 250 ml.
3. Watch glasses, 3 inch.
4. Paper towels.
5. Ziplock bags.

3. Loading Procedures

1. Place four samples on top of the yellow table and four numbered sets (6 beakers and 6 watch glasses per set) of clean beakers and watch glasses. Check that the beaker numbers match the sample numbers.
2. Place a sheet of paper on the table with the oven on it and transfer one sample and the 6 appropriately numbered beakers on the same table.
3. Open the outside bag with the label in it and set it to the side while transferring the sample from the inside sample bag. Cut off one corner of the sample bag and pour 1/6th of the sample into each of the 6 containers and cover with watch glasses. Load these six beakers into the oven.
4. Repeat the above Step 3 for the other three samples on the yellow table.

4. Drying

1. Turn on the oven with the main on-off switch.

2. Check to be sure the temperature dial is set with the indicating mark between the 5 and 6 at or slightly below 90°. A lower temperature can be used if a given industrial bulk sample has highly volatile constituents.
3. The vent at the top should be open all the way to allow maximum removal of moisture.
4. Return to check the temperature on the oven about 1 hour after it is turned on. It should read between 85 and 95° C. Adjust the temperature setting if it reads outside this range.
5. Continue drying until
   a. the samples have dried at least 24 hours,
   b. the entire sample appears friable and dry, and
   c. no moisture appears on the bottom of the watch glass when the samples are cooled. (Check about 1/2 hour after opening door.)

5. Unloading

1. After the drying is complete, turn the oven off and open the oven door to allow the beakers and soil to cool. Allow about 2 (two) hours for this cooling. The beakers should feel only warm when handling.
2. Remove the six beakers for the first sample from the oven and place on the table in front of the oven. Obtain the appropriate sample label and outside bag. Transfer the dry soil to a new zip lock bag and place inside the outside bag with the appropriate label. Check again to be sure the label number matches the number on the beakers.
3. Continue until all samples are unloaded.
4. Place the dried, packaged samples in the box to the right of yellow table.

6. Cleaning Beakers and Watch Glasses

1. Wipe beakers with paper towels to remove soil.
2. Rinse beakers and watch glasses and place in dishwasher for final cleaning. Use about 1/2 as much soap as usually required.

Bulk Sample Sieving-Standard Operating Procedure

1. General Discussion

The bulk soil, industrial material and road dust samples must be segregated before analysis. This procedure describes the isolation of a <38 µm fraction.

Special care must be taken to prevent the spread of dust to any other sample handling or analysis area of the lab, and to prevent cross-contamination of the soil samples. Clean the work area and spatulas with methanol dampened Kaydry towels between each sample handling.

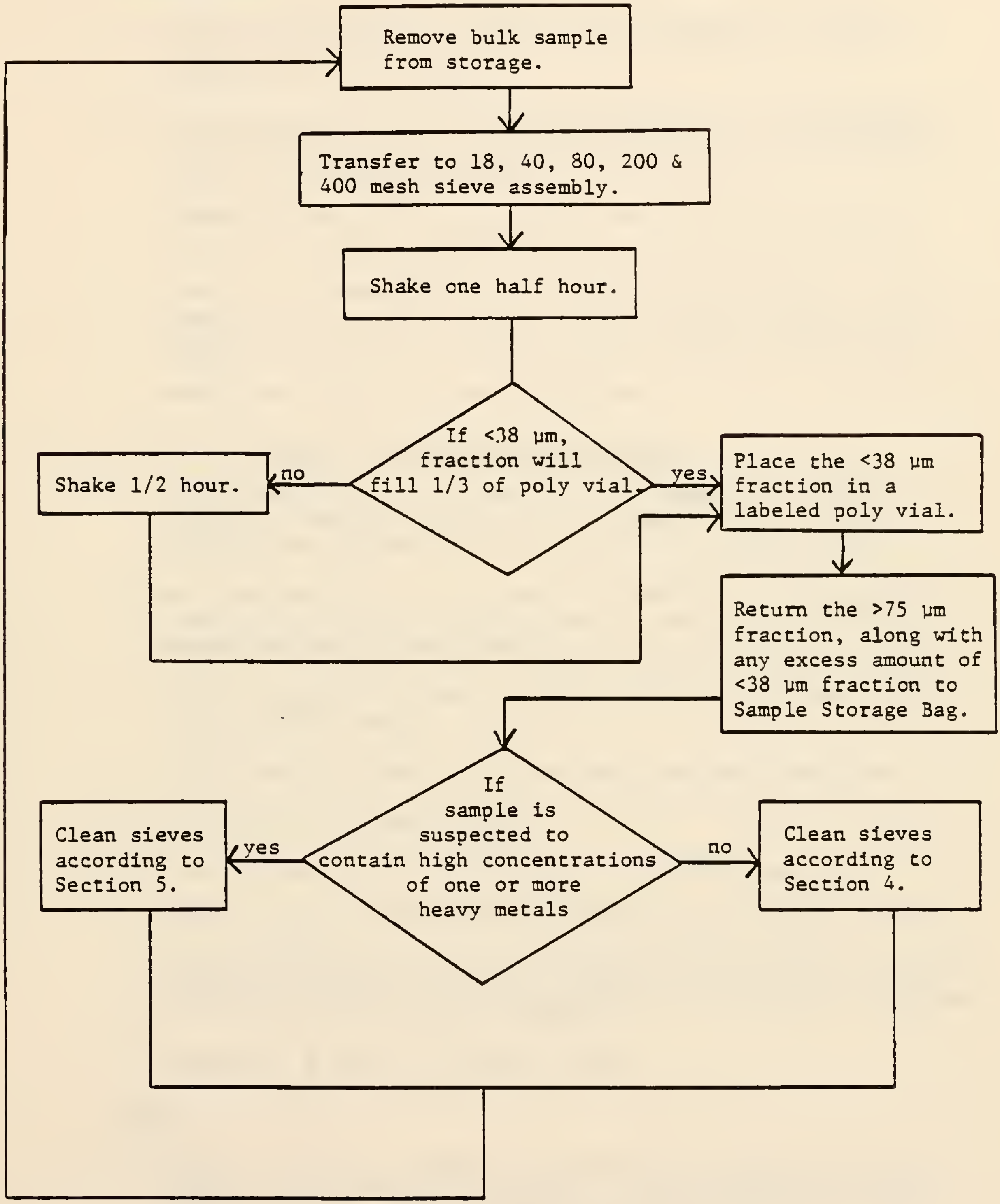
2. Materials and Equipment

1. Set of Tyler sieves, as indicated plus top cover and bottom pan.

USA No.	Opening µm
18	1000
40	425
80	180
200	75
400	38

2. Tyler sieve shaker, Model RX-24
3. Polyvials, 26 ml.
4. Kaydry disposable towels.
5. Compressed air
6. Spatulas, large and small sizes.
7. Methanol
8. Soft bristle brush
9. Detergent soap
10. Oven
11. Insulated gloves

3. Flow Diagram


Remove bulk sample from storage.
Transfer to 18, 40, 80, 200 & 400 mesh sieve assembly.
Shake one half hour.
If <38 µm, fraction will fill 1/3 of poly vial
no
Shake 1/2 hour.
yes
Place the <38 µm fraction in a labeled poly vial.
Return the >75 µm fraction, along with any excess amount of <38 µm fraction to Sample Storage Bag.
If sample is suspected to contain high concentrations of one or more heavy metals
yes
Clean sieves according to Section 5.
no
Clean sieves according to Section 4.

4. Sieve Cleaning

   1. This procedure should be done in a room dedicated for sieve cleaning or outside to prevent the spread of dust to sample handling areas of the lab.

   2. Use compressed air to blow away all loose dust. Pay particular attention to the screen, the screen-to-frame joint, and overlapping surfaces on the frame.

   3. Carefully brush all loose dust from the wire mesh screen and frame with a soft bristled brush.

   4. Wipe all dirt from sieve with a methanol moisened Kaydry towel. Clean both inside and outside and below as well as above the screen.

   5. Repeat Step 4 until the sieve is clean.

5. Sieve Cleaning After High Heavy Metals Samples

   1. This procedure should be done in a room dedicated for sieve cleaning or outside to prevent the spread of dust to sample handling areas of the lab.

   2. Use compressed air to blow away all loose dust. Pay particular attention to the screen, the screen-to-frame joint and overlapping surfaces on the frame.

   3. Carefully brush all loose dust from the wire mesh screen with a soft bristled brush.

   4. Wash screens thoroughly with detergent soap and rinse clean.

   5. Dry screens with paper towels.

   6. Place screens loosely in oven and dry for 10 minutes at 110° C.

   7. Remove screen from oven with insulated gloves and allow to cool.

   8. Wipe all dirt from sieve with a methanol moisened Kaydry towel. Clean both inside and out, paying particular attention to grooves and corners where dirt may accumulate.

   9. Repeat Step 8 until the sieve is clean.

6. Sieving

   1. Clean the bottom pan using a methanol dampened Kaydry towel and assemble the cleaned Tyler sieves in the following order, from bottom to top: bottom pan, 400 mesh screen, 200 mesh screen, 80 mesh screen, 40 mesh screen, 18 mesh screen.

2. Select a dry sample in the order in which they were logged in for processing.

3. Remove the inner bag and sample data card from the outer bag. Set them aside for later use.

4. Transfer the contents of the sample bag to the sieve assembly; minimize the loss of fine dust by dumping the sample into the sieve slowly and carefully. Set the sample bag aside for later use.

5. Clean the top cover using a methanol dampened Kaydry towel, and put the top cover into position on the sieve assembly.

6. Place the sieve assembly into position on the shaker. Press the locking tab down firmly onto the sieve assembly with one hand and tighten the locking tab screw with the other hand. Repeat for the other locking tab.

7. Start the shaker. If dust escapes from the sieve assembly, either the assembly is not mounted tightly enough, or there is foreign material between the mating surfaces of the sieves. Correct and restart if necessary. Using the built-in timer, run the shaker for one half hour.

8. While the sample is shaking, clean the sieves not in use according to the procedure in Section 4 or 5.

9. Remove the sieve assembly from the shaker and set on a clean Kaydry towel. Remove the sieves and top cover as a unit from the bottom pan and set on a clean Kaydry towel.

10. Using a clean spatula, transfer dust from the bottom pan to a new 10 ml Polyvial. Fill the Polyvial about 3/4 full. Close the lid and cut off the hinge. Record "I.D. ________" (from the sample data card) and "size <38 μm" on the polyvial.

11. Transfer the material remaining in the 18, 40, 80, 200 and 400 mesh sieves carefully into the bottom pan; tapping lightly on the sieve frame will remove most of the material.

12. Transfer the excess material from the bottom pan to the sample bag.

13. Record the date the sample was dried and sieved in the log book along with applicable comments.

14. Repeat steps 1-13.

SOIL, BULK MATERIAL AND ROAD DUST RESUSPENSION

Standard Operating Procedure

1. General Discussion

This resuspension procedure provides size-segregated samples on filters of sieved soil, road dust, and other bulk materials suitable for NAA, XRF and other analyses.

Resuspension is accomplished using a dichotomous sampler, a lo-vol sampler and a special resuspension chamber. Filters are weighed in accordance with the SOP: Teflon Filter Weighing Using the Cahn 27 Electrobalance.

Samples collected using this procedure generally are very fragile. Use caution when handling them to avoid jarring particulates loose from the filters.

2. Materials and Equipment

- Sierra Model 244 dichotomous sampler
- NEA lo-vol sampler
- Sierra Model Fh-240-P filter holders
- Nucleopore lo-vol filter holder
- Lo-vol filter rain shield with plastic extension tube
- Resuspension chamber
- Resuspension chamber gasket
- Resuspension platform
- Watch glass support assembly
- Air pump with in-line filter, ≅ 40 lpm flow rate
- Glass fiber filters, 8 X 10 inches
- Membrana Teflo filters, 37 mm and 47 mm diameter
- Watch glass
- Small spatula
- Methanol
- Kaydry towels

3. Sample Resuspension - Dichotomous Sampler

1. Clean the resuspension platform, the dichotomous sampler head, the resuspension chamber gasket, the watch glass support assembly, and the inside surface of the resuspension chamber with a methanol-dampened Kaydry towel. Continue cleaning using fresh towels until no dirt is picked up.
2. Cover the lo-vol port with a clean 400 ml beaker.
3. Place the resuspension chamber gasket on the resuspension platform and set the chamber on the gasket.
4. Tape a glass fiber filter in position on the resuspension chamber air inlet.
5. Use a spatula to transfer a small amount, ≅ 50 mg, of sample to a clean watch glass.
6. Place the watch glass on the watch glass support assembly and transfer it to the resuspension chamber. Secure the watch glass support assembly to the resuspension chamber with the latches.
7. Connect the air pump hose to the port in the watch glass support assembly.
8. Load two 37 mm filters into filter holders and place them in sampling position.
9. Turn on the air pump for 10 seconds.
10. After 10 seconds, turn off the air pump and turn on the dichotomous sampler. Run at normal flow rates, 16.7 lpm total and 1.67 coarse, for 20 minutes.
11. Remove the filters and note the appearance of their deposits. Repeat steps 5-10 until the coarse fraction filter has optimum loading (0.5-3 mg).
12. If the loading on the fine fraction filter is < 0.5 mg, repeat steps 5-10 using a blank coarse fraction filter and the same fine fraction filter. Continue until the fine filter has optimum loading (≥ 0.5 mg).

4. Sample Resuspension - Lo-vol Sampler

1. Clean entire system as with dichotomous samples.

2. Remove dichotomous sampler head and cover port with a clean 400 ml beaker.

    2a. Load a 47 mm filter into a lo-vol filter holder and connect to lo-vol port in the resuspension platform. Place extension tube and rain shield over filter holder.

3-7. Same as with dichotomous samples.

8. Turn on air pump for 10 seconds.

9. After 10 seconds, turn off the air pump and turn on the lo-vol sampler. Run for 20 minutes.

10. Repeat steps 5-9 until sufficient deposit is on filter.

5. Calculations

1. Calculate net weight according to the SOP: Teflon Filter Weighing Using the Cahn 27 Electrobalance.

2. Because of the design of the dichotomous sampler, one ninth of the fine particles sampled are collected on the coarse fraction filter instead of the fine fraction filter. A correction to the total mass and to the mass of each chemical species measured must be made.

$M_{ft} = 1.11\ M_f$ and

$M_{ct} = M_c - 0.111\ M_f$,

where M_{ft} = true fine particle mass

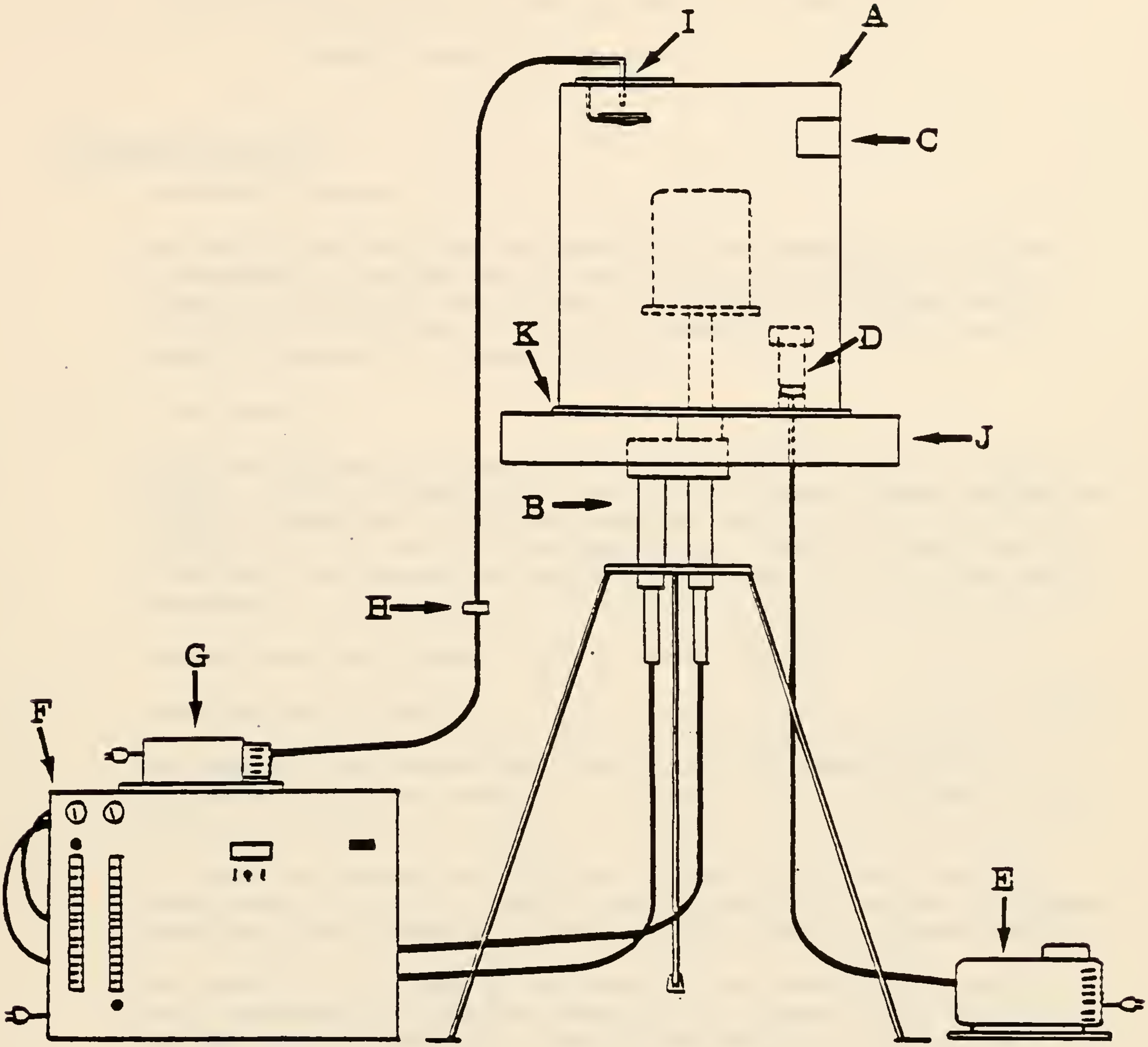
M_f = measured fine particle mass

M_{ct} = true coarse particle mass

M_c = measured coarse particle mass

If fine mass is < 10% of coarse mass, then the correction to coarse mass is only about 1% and need not be made.

Schematic of Resuspension Chamber System



A. Resuspension chamber
B. Dichotomous sampler
C. Intake air filter
D. Lo-vol sampler filter assembly
E. Lo-vol sampler pump
F. Dichotomous sampler control unit
G. Resuspension air pump (40 liters/minute)
H. In-line air filter
I. Watch glass support assembly
J. Resuspension platform
K. Resuspension chamber gasket

TEFLON FILTER WEIGHING USING THE CAHN 27 ELECTROBALANCE

Standard Operating Procedure

1. General Discussion

1. Analytical Problem:

   The mass of air particles collected on teflon membrane filters must be determined to an accuracy of better than ± 10% relative. Two sizes of filters are used, 37 and 47 mm diameter, with tare weights of about 75 ± 20 mg and 120 ± 20 mg, respectively. Minimum net weight is expected to be about 120 μg.

2. Interferences:

   Electrostatic charge on the filter is one possible source of interference. This is eliminated by use of a beta source charge neutralizer. Humidity changes may affect the weight of deposit, but not the weight of filters, since they are non-hygroscopic. Humidity changes are minimized by performing the weighing procedures in an air conditioned laboratory.

3. Minimum Detectable Quantity: 15 μg (three sigma).

4. Precision and Accuracy:

   The balance is calibrated with class M weights. Repeatability for the immediate reweighing of a filter is ± 1 μg; long term repeatability is ± 5 μg.

5. The technician should read the Cahn 27 Instruction Manual entirely before using the balance, paying close attention to Section 3, Balance Operation. The balance is always left ON to provide maximum stability.

6. The control filters used in the procedure are identified by marking their containers with control number and lot number. They are from the same manufacturing lot as the filters they are weighed with.

7. Keep the calibration weights clean and store in their proper container. Handle them only with the cleaned weight forceps (non-serrated stainless steel) and do not use the weight forceps for any other job.

2. Equipment and Materials

- Cahn 27 Electrobalance with custom 60 mm open stirrups
- Po^{210} charge neutralizer
- Calibration weights, 10, 20, 50 and 100 mg Class M
- Tare weights, 20 50 and 100 mg Class C
- weight forceps
- filter forceps
- Kaydry towels
- Kimwipes
- Methanol

3. Operating Procedure

3.1 Start Up:

1. Remove the stirrups from the weighing chamber as in Section 3.1.2 of the Cahn 27 Instruction Manual and set aside on a clean Kimwipe. Clean the weighing chamber with a methanol dampened Kimwipe. Replace the stirrups, one on the A side and one on the TARE side. Place the charge neutralizer in the center of the weighing chamber. Clean the area around the balance and lay out a clean Kaydry towel in front of the weighing chamber. Clean the weight forceps (non-serrated stainless steel) and filter forceps using a methanol dampened Kimwipe.

2. Obtain the calibration weights, control filters, and the filters to be weighed from the sample storage cabinet.

3. Record technician, date and filter lot number on the data sheet.

4. Determine approximate weight of one of the control filters by weighing on the A200 range. Select the 10, 20, 50 and 100 mg calibration weights in combination such that their combined weight equals within + 8 and - 12 mg of the control weight. (When doing gross weights, use the same weights as for the tare weighing).

5. Set the balance controls to RANGE: A 20 and RESPONSE: 0. Make sure CALIBRATE, COARSE and FINE ZERO controls are locked. Press TARE twice to untare the balance.

6. Place the selected calibration weights on the A pan and balance with appropriate tare weights on the TARE pan so that the display reads ± 20 mg.

7. When the display stabilizes (after at least 30 seconds), press TARE to zero the balance.

8. Add the 20 mg calibration weight to the A pan (or remove it if already there). Display should read + 20.000 ± 0.001 (or - 20.000 ± 0.001) when it stabilizes. If not, adjust CALIBRATE accordingly.

9. Replace calibration weight and note that 0.000 ± 0.001 is displayed. If not, repeat steps 7 and 8. Record tare weight as the sum of the calibration weights ± display reading, and the calibration reading on the data sheet.

10. Remove calibration weights to their container.

3.2 Weighing Filters:

1. The three control filters are to be weighed first. Then up to 20 air filters can be weighed. When weighing the filters, note any defects (torn, particles falling off, etc.) on the data sheet.

2. Place the first filter to be weighed on the charge neutralizer. After a few seconds, transfer the filter to the A platform and place the next filter to be weighed on the charge neutralizer.

3. When the display stabilizes (after at least 30 seconds), record the filter ID number and weight reading including + or - sign on the data sheet.

4. Transfer the filter from the A platform to its container, transfer the filter on the charge neutralizer to the A platform, and place the next filter in sequence on the charge neutralizer.

5. Repeat steps 3 and 4 until weighing of the set is complete.

6. Place the calibration weight(s) on the A pan. Record tare weight as the sum of the calibration weights ± display reading. Press TARE if the reading is not 0.000.

7. Place calibration and tare weights in their containers.

3.3 Reweights:

1. Select at random three filters to be reweighed, preferably by another technician.

2. Use the Start Up and Filter Weighing procedures with the following differences:
    1) The control filters need not be reweighed.
    2) Filters from up to 4 sets can be reweighed at the same time.

3.4 Shutdown:

1. Replace the control filters and the filters that were weighed in the sample storage cabinet.
2. Clean the balance as in 3.1.1.
3. Record the date of the weighing in the appropriate Sample Log Book.

3.5 Calculations:

$$W_n = (W_g - W_t - \Delta C) \times 1000$$

Where: W_n = net deposit in micrograms

W_g = gross weight in mg

W_t = tare weight in mg

$$\Delta C = \frac{\sum_{i=1}^{3} (\text{Gross weight Control}_i - \text{Tare weight Control}_i)}{3}$$

3.6 Quality Control:

1. The tare weight chek at the end of a weighing set (Section 3.2.6) must be within ± 0.004 mg of their correct values or the entire set must be reweighed.
2. The reweights (Section 3.3) must all be within ± 10 μg or the entire set must be reweighed.

TARE	± .	± .
CALIB.	± .	± .

RESEARCHER: ______

Filter I.D. #	Tare Weight (mg)	Gross Weight (mg)	Net Weight (μg)
C	.	.	
C	.	.	
C	.	.	
	.	.	
	.	.	
	.	.	
	.	.	
	.	.	
	.	.	
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	.	.	
	.	.	
	.	.	
	.	.	
	.	.	
	.	.	
TARE	.	.	

Lot No. ☐☐☐☐

Date ______

COMMENTS

STANDARD OPERATING PROCEDURE

ENERGY DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF AIR FILTERS

1. General Discussion

1. Analytical problem: Analysis of aerosols deposited on membrane type filters for the elements listed in Table 1. Typical atmospheric concentrations and ranges are indicated in Figure 1.
2. Principle: Atoms in the sample are excited from their ground state to higher energy levels by x-radiation from an X-ray tube. These excited atoms emit discrete energy X-rays as they return to their normal ground state energy level. The energy of these emitted X-rays is characteristic of the emitting element and is used to qualitatively identify the element while the number of observed X-rays, which is proportional to the number of atoms, is used to quantitatively determine a specific element's concentration through a direct comparison with standards.
3. Interferences: There are a number of potential spectral interferences possible with EDXRF because of its low resolution relative to the number and spacing of possible X-ray lines. The elements subject to potential spectral interferences in normal ambient aerosols, along with the corresponding interfering elements and correction factors are listed in Table 2. Correction factors, F_{im}, are determined by analyzing single element standards of elements i and applying the formulas

$$F_{im} = \frac{N_m}{N_i}$$

where F_{im} = the fraction of counts due to element i that interfere with the counts for element m

N_m = background subtracted counts in region of interest m

N_i = background subtracted counts in region of interest i

Table 1

X-RAY FLUORESCENCE
MINIMUM DETECTABLE CONCENTRATIONS*
(ng/cm^2)
STANDARD ANALYSES+

Element	1	2	3	4	5**
Al	42	30	30	18	10
Si	35	24	18	12	8
P	45	30	23	15	10
S	140	90	70	47	30
Cl	90	60	45	32	20
K	30	20	15	11	6
Ca	30	20	15	11	6
Ti	10	6	5	3	2
V	6	4	3	2	1
Cr	6	4	3	2	1
Mn	9	6	5	3	1
Fe	12	8	6	4	2
Ni	10	6	5	3	1
Cu	10	6	5	3	1
Zn	10	6	5	3	1
Ga	8	6	4	3	1
As	8	6	4	3	1
Se	8	6	4	3	1
Br	12	8	6	4	2
Rb	20	14	10	7	4
Sr	20	16	10	8	4
Y	40	30	22	15	8
Zr	160	120	84	60	30
Pd	45	30	22	15	8
Ag	70	48	34	24	12
Cd	70	50	36	25	14
In	90	60	44	30	15
Sn	90	60	44	30	15
Sb	90	60	44	30	15
Ba	500	360	260	180	100
La	500	360	260	180	100
Hg	20	16	11	8	4
Pb	25	20	14	10	5

* Three sigma interference-free MDC for particulates deposited on filters with 1 mg/cm^2 densities such as Nuclepore and some cellulose and teflon filters MDC ∿ $(\text{time})^{-\frac{1}{2}}$ $(\text{filter density})^{\frac{1}{2}}$

** For stretched teflon filters

+ Custom analysis for specific elements at special MDC's available upon request.

Figure 1

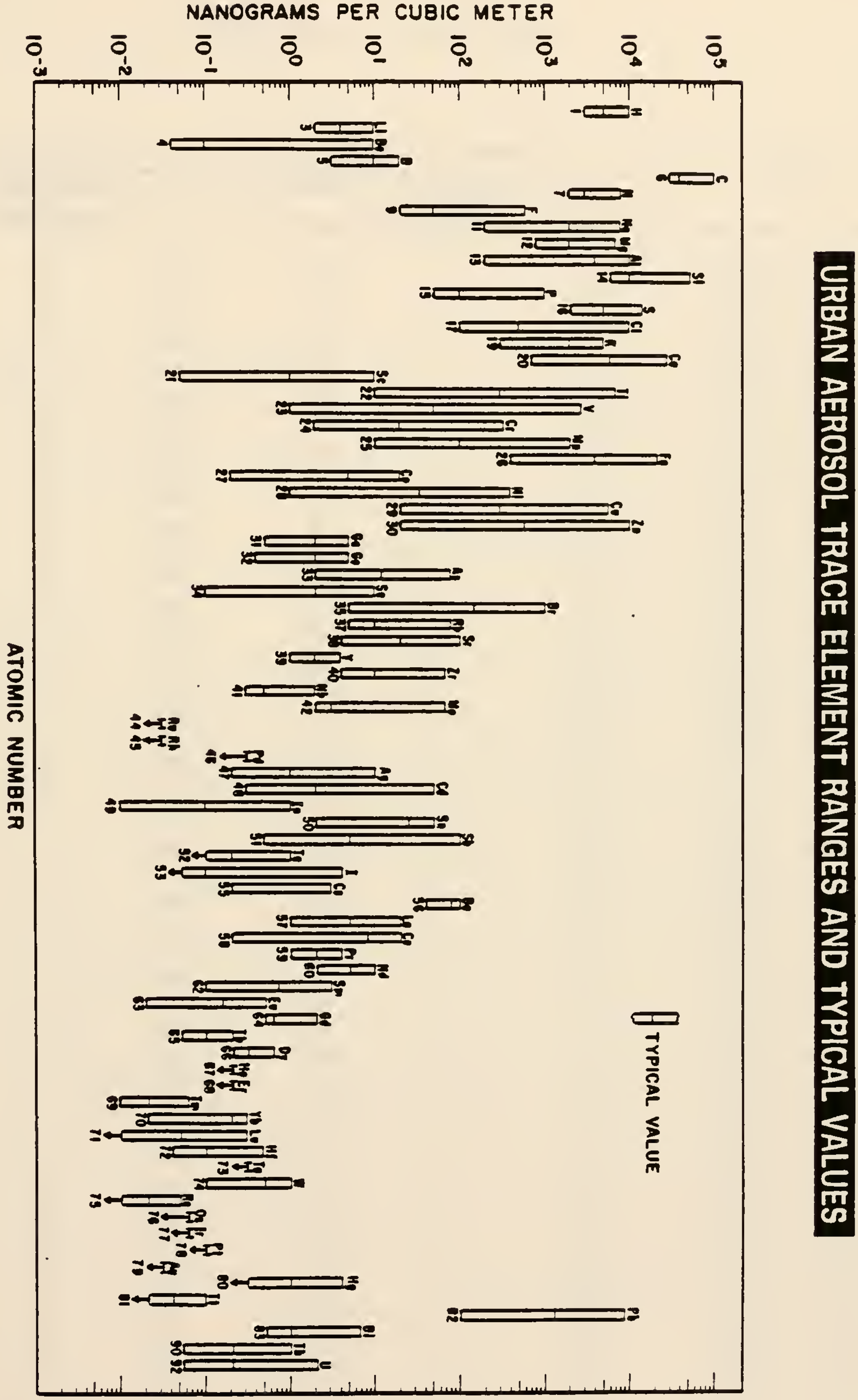

URBAN AEROSOL TRACE ELEMENT RANGES AND TYPICAL VALUES
NANOGRAMS PER CUBIC METER
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
ATOMIC NUMBER
TYPICAL VALUE

Table 2

Potential Spectral Interferences

Element of Interest			Element of Interest			F_{im}
Element	Excitation Condition	Line	Element	Excitation Condition	Line	
Mg	2	Kα	Br	1	Lα	0.0098 ± 0.0003
Al	2	Kα	Br	1	Lα	0.176 ± 0.001
Al	2	Kα	K	2	escape	0.0047 ± 0.0005
Si	2	Kα	Br	1	Lα	0.0028 ± 0.0003
Si	2	Kα	Sr	1	Lα	0.285 ± 0.002
P	2	Kα	Ca	2	escape	0.0137 ± 0.0009
K	2	Kα	Ca	2	Kα	0.0121 ± 0.0008
K	2	Kα	Cd	1	Lβ	1.116 ± 0.006
Ca	2	Kα	K	2	Kβ	0.0309 ± 0.0008
S	3	Kα	Pb	3	M	0.19 ± 0.02
Cl	3	Kα	S	3	Kα	0.026 ± 0.005
Cl	3	Kα	Pb	3	M	0.073 ± 0.002
K	3	Kα	Cd	1	Lβ	0.401 ± 0.003
Ca	3	Kα	K	3	Kβ	0.070 ± 0.002
Ti	3	Kα	Ba	1	Lα	4.52 ± 0.04
V	3	Kα	Ba	1	Lβ	2.38 ± 0.02
V	3	Kα	Ti	3	Kβ	0.127 ± 0.002
Cr	3	Kα	V	3	Kβ	0.132 ± 0.002
Mn	3	Kα	Cr	3	Kβ	0.130 ± 0.001
Fe	3	Kα	Mn	3	Kβ	0.116 ± 0.001
As	3	Kα	Pb	3	Lα	1.11 ± 0.01
Br	3	Kα	Pb	3	Lβ	0.014 ± 0.001
Cu	1	Kα	Ni	1	Kβ	0.065 ± 0.002
Zn	1	Kα	Cu	1	Kβ	0.0376 ± 0.0006
Ga	1	Kα	Zn	1	Kβ	0.0149 ± 0.0004
Ga	1	Kα	Pb	1	Lα	0.060 ± 0.001
Hg	1	Lα	Pb	1	Lα	0.0033 ± 0.0002
Hg	1	Lα	Br	1	Kα	0.00063± 0.00006
As	1	Kα	Pb	1	Lα	1.196 ± 0.005
Se	1	Kα	Pb	1	Lα	0.0076 ± 0.0004
Br	1	Kα	Pb	1	Lβ	0.0140 ± 0.0005
Se	1	Kα	Br	1	Kα	0.0012 ± 0.0001
Rb	1	Kα	Br	1	Kβ	0.156 ± 0.001
Rb	1	Kα	Pb	1	Lβ	0.0107 ± 0.0004
Sr	1	Kα	Pb	1	Lγ	0.0073 ± 0.0007
Sr	1	Kα	Br	1	Kβ	0.0008 ± 0.0002
Y	1	Kα	Rb	1	Kβ	0.170 ± 0.001
Y	1	Kα	Pb	1	Lγ	0.121 ± 0.002
Y	1	Kα	Br	1	Kβ	0.0008 ± 0.0002
Y	1	Kα	Sr	1	Kβ	0.0025 ± 0.0003
Zr	1	Kα	Sr	1	Kβ	0.166 ± 0.001
Zr	1	Kα	Pb	1	Lγ	0.0088 ± 0.0009
Zr	1	Kα	Br	1	Kβ	0.0009 ± 0.0003
Sb	1	Kα	Cd	1	Kβ	0.0245 ± 0.0008

and

$$\sigma F_{im} = \left[\left(\frac{\sigma N_m}{N_m}\right)^2 + \left(\frac{\sigma N_i}{N_i}\right)^2\right]^{\frac{1}{2}}$$

where σF_{im} = uncertainty in F_{im}

σN_m = uncertainty in N_m

σN_i = uncertainty in N_i

Samples exhibiting chemical composition uncharacteristic of normal ambient aerosols may require additional corrections.

4. Minimum Detectable Concentrations (MDC) on filters are determined by the formula

$$MDC_i = 3\sqrt{B_i}\ \frac{M_i}{N_i}$$

where

MDC_i = the minimum detectable concentration of element i

M_i = known concentration of element i

N_i = Net number of counts measured when element i is analyzed under standard conditions

B_i = Number of background counts subtracted from total counts in region of interest i to obtain N_i.

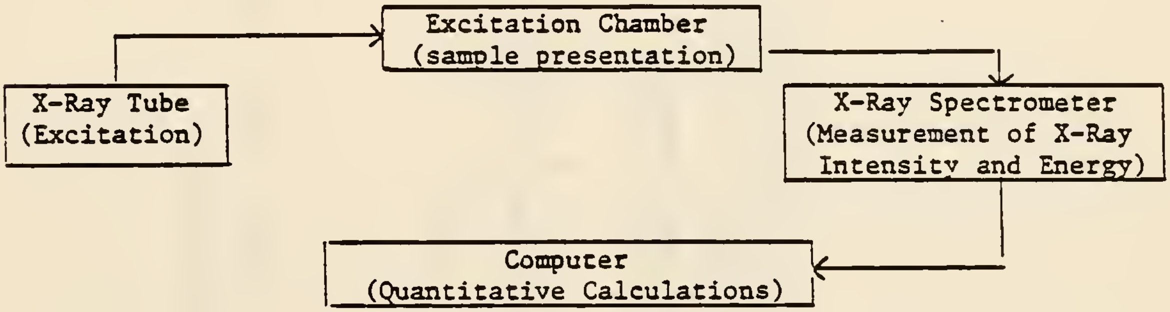
Table 1 lists MDC's for 5 standard analysis conditions.

5. Background Subtraction: Most of the background counts in a region of interest are due to the scattering of primary radiation from the sample. The amount of this scattering depends upon the mass of the sample presented to the primary excitation beam. A blank filter is run under each excitation condition and the background in each region of interest is linearly related to a high energy incoherent scatter peak due to the primary radiation. The same scatter peak is monitored on all loaded samples and the linear relationship is used to estimate the background in the analyte line region of interest.

6. Precision and Accuracy: Count variations of less than 1% are typical over 24 hour periods. Figure 2 shows the variability of the QC filter for the analysis of 630 filters over a period of 2 months (< ±1.5%). All results are reproducible to within 1% when counting statistics are not the primary source of uncertainty. The accuracy in terms of the deposit on the filter is primarily limited by the uncertainties in the standard values which are typically 5%. Errors in the absorption corrections for the low atomic number elements ($Z<20$) may approach the same order of magnitude as sampling errors.

2. Apparatus

The x-ray fluorescence analyzer used for the analysis is an Ortec TEFA III system. A block diagram of its major components is shown below:

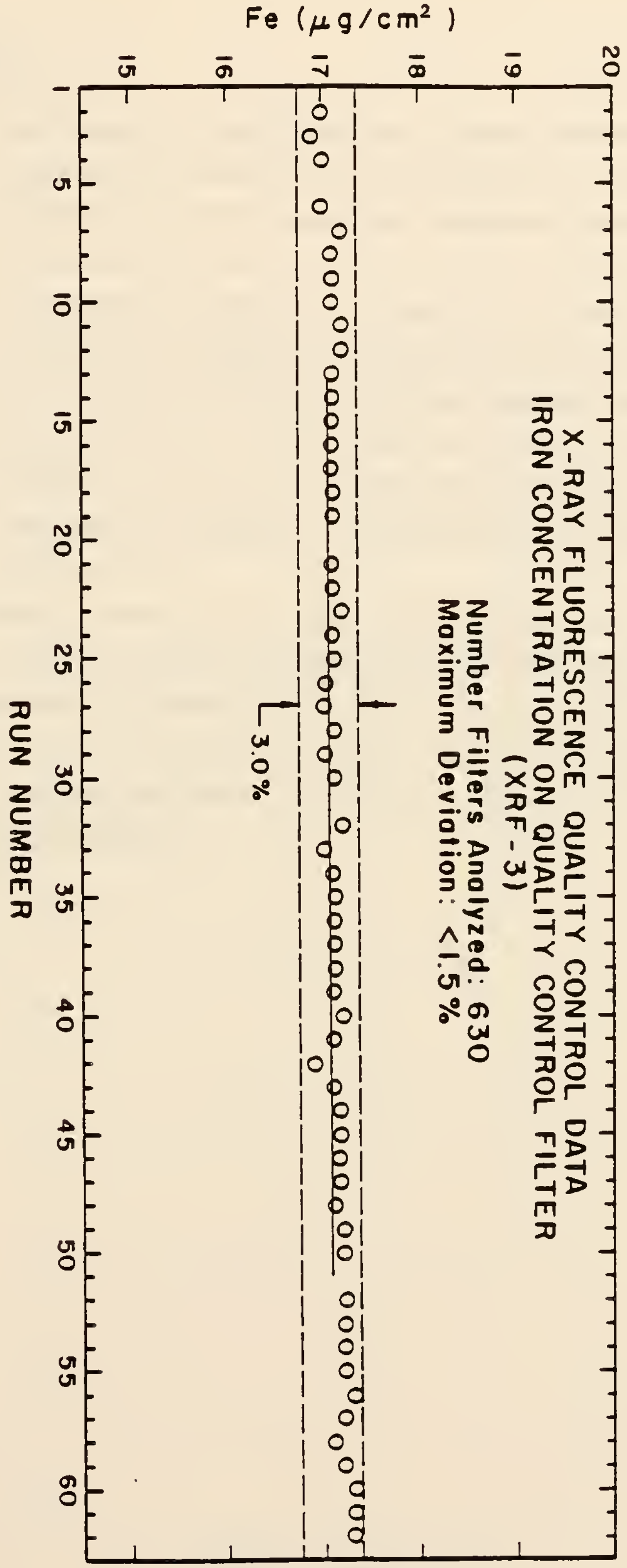


The primary function of the excitation system is to generate inner shell electron vacancies which result in the emission of x-rays characteristic of the sample elements. The TEFA system has a dual anode Mo/W x-ray tube. Mo and Cu primary x-ray filters can be used to obtain monochromatic excitation.

Air filters are presented to the excitation radiation and spectrometer in an evacuated excitation chamber.

The x-ray spectrometer consists of a Si(Li) x-ray detector amplifier and pulse height analyzer which measures the energy and intensity of the characteristic x-rays generated in the above excitation procedure.

Figure 2

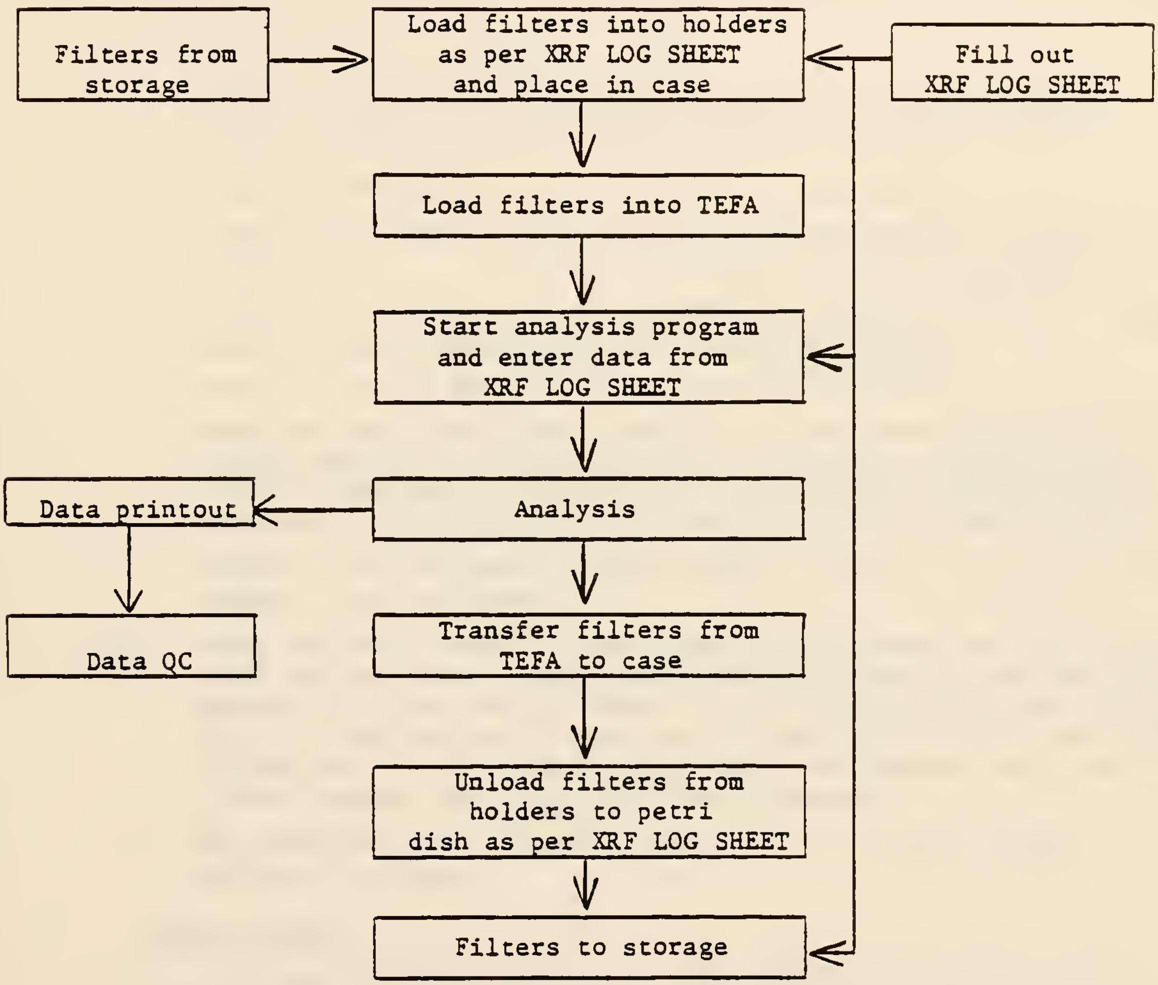

X-RAY FLUORESCENCE QUALITY CONTROL DATA
IRON CONCENTRATION ON QUALITY CONTROL FILTER
(XRF-3)
Number Filters Analyzed: 630
Maximum Deviation: <1.5%
Fe (μg/cm²)
15
16
17
18
19
20
3.0%
RUN NUMBER
1
5
10
15
20
25
30
35
40
45
50
55
60

3. Calibration

The instrument is calibrated with single element thin film vapor deposited standards obtained from Micromatter Co., Eastsound, WA., and with multielement solution deposited standards obtained from Columbia Scientific Industries, Austin, TX. Particle standards obtained from Columbia Scientific Industries are used for Al and Si calibration. Plots of instrument response versus atomic number should yield smooth curves, and are used to validate standard concentrations. The surface concentration relevant to a specific excitation condition for each standard element is listed in the Standards Notebook. The standards are kept permanently mounted in clean, closed containers and are labelled with an ID number.

Standard concentration values are entered into the computer and stored on floppy disk by the ORACL program MAKSTD. The instrument is then calibrated by proceeding with a normal run, and using an "S" prefix for each of the standard ID numbers. Details of software usage are in the TEFA Software Notebook. Calibration should be performed only by supervisory personnel.

4. Flowchart Summary


Filters from storage
Load filters into holders as per XRF LOG SHEET and place in case
Fill out XRF LOG SHEET
Load filters into TEFA
Start analysis program and enter data from XRF LOG SHEET
Data printout
Analysis
Data QC
Transfer filters from TEFA to case
Unload filters from holders to petri dish as per XRF LOG SHEET
Filters to storage

5. Operating Procedure

The TEFA operating manual should be reviewed before operating the instrument. One should be familiar with the hazards of incorrect operation and the safety systems of the TEFA. Only designated personnel should operate the instrument and no procedures other than the ones described here should be performed unless instructed otherwise by the laboratory supervisor.

5.1 TEFA Start-up

1. Obtain TEFA key from the standards cabinet and switch CONTROL POWER to ON.
2. Press the SYSTEM POWER ON button.
3. Obtain the XR program disk from storage and insert in drive 0 (left hand drive).
4. Press the PWR button on the EEDS II control panel.
5. Adjust the MARKER joystick so that elapsed time is displayed on the CRT.
6. Turn on the printer, set to ON LINE, and switch to 8 LPI. Advance paper to top of page using the FORM ALIGN controls.
7. Press HV1 on the EEDS II control panel.
8. Press the DATA ENTRY X-RAYS button. A data parameter is selected by first pressing the RETURN key until the cursor is opposite the desired parameter, then pressing the space bar. Valid entries are displayed on the CRT. Set TUBE VOLTAGE to 5.0 Kv and TRAY SIZE to 12.
9. Press the SYSTEM CONTROL STANDBY button. Make sure the excitation chamber cover is closed.
10. After waiting 3 minutes, press the SYSTEM CONTROL ON button. This turns on the x-rays. The 3 red X-RAYS ON lights in the RADIATION section will come on, the green X-RAYS OFF light will go out, X-RAYS ON will flash on the CRT and the red X-RAYS ON light in the SYSTEM CONTROL section will flash. The excitation chamber cover must remain closed whenever the x-rays are being produced.
11. The TEFA should be allowed to warm up for 30 minutes before beginning analysis.

5.2 Filter Loading

1. Fill out an XRF LOG (Figure 3) with PROJECT NAME, INITIAL, ID numbers and particle size codes (S). If there are also customer ID numbers, record them in the comments column. ID numbers and particle size codes are obtained from the sample LOG Book. Record the date in the XRF column in the Sample Log Book for all samples loaded. All 12 positions need not be filled. Position 1 must be a blank of the same type and preferably the same manufacturing lot as the filters to be analyzed. The blank ID must begin with "B". The last position must be a quality control standard. Obtain its ID number from the laboratory supervisor.

Figure 3

Energy Dispersive X-Ray Fluorescence Analysis of Air Filters

XRF LOG

PROJECT NAME ____________________

DATA DISK ____________________

DATE ____________________

TIME ____________________

ANALYSIS SEQUENCE ____________________

INITIAL:

LOAD ________ ANALYZE ________ UNLOAD ________ QA ________

POSITION	ID					S	COMMENTS
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

(Rev. August, 1981)

2. Filter loading is done in the laminar flow hood. Turn the hood blower and lights on and clean the work surface with a Kaydry towel and methanol. Lay out a Kaydry towel in the hood. Clean a pair of forceps and the filter loading block with Kimwipes and methanol and place on the towel. Clean an XRF sample case inside and out and place in the hood. Obtain the filters to be analyzed from the sample storage cabinet. Place the filters to be loaded, a set of numbered filter holders, a box of Kimwipes, a methanol container, the XRF LOG and a pen in the hood. The filter containers should be labelled with their ID numbers.
3. Clean the filter holders with Kimwipes and methanol. Pay particular attention to surfaces which the filters will contact. Wear disposable gloves to avoid excess contact with methanol. When finished cleaning the filter holders, remove gloves and rinse hands if gloves are of the talced variety.
4. Select filter holder 1, place on the filter loading block, and remove the retaining ring. If the blank has already been loaded from a previous run, select filter holder 2 instead of 1.
5. Select the filter whose position number as indicated on the XRF LOG corresponds to the filter holder. Note the condition of the filter and record any comments on the XRF LOG that may apply to XRF analysis, such as uneven deposit, wrinkled filter, water spot on filter, etc. Filters with loose deposits should not be analyzed.
6. Remove the filter from its container and place deposit side down in the filter holder. Use forceps and handle the filter only around its perimeter. If the deposit is touched by the forceps, clean them before proceeding.
7. Replace the retaining ring so that the filter is held in place without any wrinkles or other misalignment.
8. Place the numbered filter holder into the like numbered location in the sample case and the filter container in the proper numbered location in the filter container tray. The blank filter holder and container can both be placed in the large section of the filter container tray.
9. Repeat steps 4-8 for the remaining filters. The quality control standard is permanently loaded and is not put into the sample case.
10. Verify that the sample ID number to position number relationship is correct. Each filter holder number must match its position number in the sample case. The ID number on each filter container must correspond to its position in the filter container tray exactly as on the XRF LOG.
11. Place the filter container tray on top of the filter holders in the sample case, put the XRF LOG in the sample case, and transfer to the TEFA.
12. Clean up the laminar flow hood.

5.3 Analyzing Filters

1. Verify that TUBE VOLTAGE is 5.0 Kv and TUBE CURRENT is 1 μamp. Press the SYSTEM CONTROL STANDBY button. Make certain the red X-RAYS ON lights are out and the green X-RAYS OFF light is on. Never open the excitation chamber cover unless this is the case.
2. Lift the excitation chamber cover to its open position.
3. Open the sample case and place the filter container tray in the lid.
4. Transfer each filter holder in sequence to the like numbered position in the TEFA sample tray. Make sure the seating is proper by rotating the filter holder and align the holder so that its indicating line points toward the center of the tray. Close the sample case. If the standard is not already in position, obtain it from the standard cabinet and place in position on the sample tray.
5. Verify that all samples are correctly loaded in their designated positions on the sample tray.
6. Make sure the excitation chamber gasket is properly seated and close the cover.
7. Push the X-RAY PATH PUMP button. The pump will quiet down after 10-20 seconds if the chamber is properly sealed.
8. Press the SYSTEM CONTROL ON button. The red X-RAYS ON lights will come on and the green X-RAYS OFF light will go out.
9. Select a formatted, zeroed disk and write the PROJECT NAME on the disk label. Use a felt tipped pen. Record the data disk number on the XRF LOG, as well as INITIAL, DATE, TIME, and ANALYSIS SEQUENCE. Obtain the analysis sequence number from the laboratory supervisor. Insert the data disk into drive 1 (right hand side).
10. Record the date, project, initial, and data disk number in the TEFA Log Book.
11. Press the DATA ENTRY X-RAYS button to return to spectrum mode, then press OPERATING MODE TERMINAL. Type "C" while holding down the CTRL key. Type R ORACL <RETURN>. Type RUN XR <RETURN>. Enter data as requested by the program and displayed on the CRT. If there are less than 12 samples, simply press return when asked for the next sample. Before verifying the particle size codes, check to see that the X-RAY PATH VACUUM READY light is on. Sample analysis begins when the particle size codes are verified and proceeds automatically from sample to sample for each excitation condition.
12. When analysis is complete, indicated by 5 beeps, press the DATA ENTRY X-RAYS button and verify that tube voltage is 5.0 Kv and tube current is 1 μamp. Press the X-RAY PATH OFF and SYSTEM CONTROL STANDBY buttons. The green X-RAYS OFF light should come on and the red X-RAYS ON lights should go out.

13. Remove the data disk and place in storage. Advance the printout to top of the page and give printout to laboratory supervisor for review.
14. When excitation chamber has reached room pressure, check that red X-RAYS ON lights are out and green X-RAYS OFF light is on, and open chamber cover.
15. Transfer in sequence each filter holder from the TEFA sample tray to its like numbered position in the sample case. If the next run will use the same blank and/or quality control standard, they may be left in the sample tray. Otherwise return the blank to the sample case and the standard to its container in the standards cabinet.
16. Close the excitation chamber cover, place the XRF LOG in the sample case and transfer to the laminar flow hood for unloading.

5.4 Unloading Filters

1. Filter unloading is done in the laminar flow hood. Turn on the hood blower and lights and clean the work surface with a Kaydry towel and methanol. Lay out a Kaydry towel in the hood. Clean a pair of forceps and the filter loading block with Kimwipes and methanol and place on the towel. Place the sample case in the hood. Record your initial on the XRF LOG.
2. Select a filter holder and the corresponding filter container from the sample case. Check that the sample ID matches position number exactly as on the XRF LOG. Place the filter holder on the loading block and the filter container next to it.
3. Remove the retaining ring and transfer the filter to its container. Usually it is easiest to hold the filter holder over the open filter container and carefully invert the filter holder so that the filter drops deposit side up into its container. Sometimes use of the forceps is necessary. Replace the filter container lid and set aside. Set the filter holder aside.
4. Repeat steps 2 and 3 for the remaining filters.
5. Return the filters to the sample storage cabinet, the filter holders to the standards cabinet and the XRF LOG to the laboratory supervisor.
6. Clean up the laminar flow hood.

5.5 TEFA Shutdown

1. Verify that tube voltage is 5.0 Kv, and tube current is 1 μamp.
2. Press the SYSTEM CONTROL STANDBY and then SYSTEM CONTROL OFF buttons.
3. Press HV1 on the EEDS II control panel to turn off the high voltage.

4. Turn off the printer.
5. Press the PWR button on the EEDS II control panel to turn off power.
6. Press the SYSTEM POWER OFF button.
7. Switch CONTROL POWER to OFF and place key in the standards cabinet.
8. Return the XR program disk to storage, and close the disk drive doors.

6. Calculations

The count rate, I_i, of x-ray photon events from element i measured by the Si (Li) detector is proportional to the mass of element i, M_i, times an attenuation factor, A_i, which takes into consideration the absorption of the primary excitation and characteristic x-rays in the sample. That is,

$$I_i = K_i M_i A_i \qquad (1)$$

where K_i is a proportionality constant. An unknown mass, M_i, may be determined by comparing the count rate measured for the unknown with the count rate, I_i^s, measured with a known standard mass M_i^s.

$$M_i = \frac{I_i\ C_i}{A_i} \qquad (2)$$

where C_i is a calibration factor,

$$C_i = \frac{A_i^s\ M_i^s}{I_i^s}\ . \qquad (3)$$

The uncertainties in M_i and C_i are given by

$$\sigma M_i = M_i \left[\left(\frac{\sigma C_i}{C_i} \right)^2 + \left(\frac{\sigma I_i}{I_i} \right)^2 \right]^{\frac{1}{2}} \qquad (4)$$

and

$$\sigma C_i = C_i \left[\left(\frac{\sigma M_i^s}{M_i^s} \right)^2 + \left(\frac{\sigma I_i^s}{I_i^s} \right)^2 \right]^{\frac{1}{2}} \qquad (5)$$

$$\frac{\sigma M_i^s}{M_i^s} = 0.05 \text{ per manufacturers specifications.}$$

Attenuation factors for elements of atomic number <15 can be substantial. A_i^s is corrected for by using particle size selected standards validated by neutron activation analysis. A_i is then determined emperically by intercomparison with neutron activation analysis for each particle size range. For $Z \geq 15$, $A_i \cong 1$ for thin aerosol deposits.

The sample count rate I_i is determined by measuring the total counts in region of interest i, subtracting the background, subtracting spectral interferences, and then dividing by the analysis live time. The channels and energies for each region of interest are shown in Table 3. Background subtraction is accomplished by subtracting the product of total counts in region of interest i for a blank filter, and the ratio of the sample to blank Mo Kα scatter peak counts, from the total counts in region of interest i. That is,

$$N_i = G_i - B_i \frac{S}{S^B} \qquad (6)$$

where N_i is background subtracted counts, G_i is total counts, B_i is total counts from a blank fitter in region of interest i, and S and S^B are counts in the Mo Kα region for sample and blank, respectively. The uncertainty in background subtracted counts is given by

$$\sigma N_i = \left[G_i + B_i \frac{S}{S^B} \right]^{1/2} \qquad (7)$$

After the background is subtracted, corrections are made for spectral interferences.

$$T_i = N_i - \sum_{m=1}^{n} F_{im} Tm, \qquad (8)$$

where n = number of interfering elements, and T_i and T_m are both background and spectral interference subtracted counts. Spectral correction factors, F_{im} (section 1.3), are shown in Table 2. The uncertainty in T_i is estimated by

$$\sigma T_i = \left[\sigma N_i^2 + \sum_{m=1}^{n} (T_m^2 \, \sigma F_{im}^{\;2} + F_{im}^{\;2} \, \sigma T_m^2) \right]^{1/2} \qquad (9)$$

Table 3

EXCITATION CONDITION: 1
ANODE: MO
FILTER: MO
VOLTAGE: 50
CURRENT: 200
ENERGY:0- 40

SPECTRUM REGIONS OF INTEREST

REGION	CHANNEL	ENERGY	ELEMENT
1	156- 164	6.24- 6.56	FE
2	183- 191	7.32- 7.64	NI
3	197- 205	7.88- 8.20	CU
4	212- 220	8.48- 8.80	ZN
5	227- 235	9.08- 9.40	GA
6	247- 251	9.88- 10.04	HG
7	258- 269	10.32- 10.76	AS
8	276- 281	11.04- 11.24	SE
9	292- 302	11.68- 12.08	BR
10	310- 320	12.40- 12.80	PB
11	329- 339	13.16- 13.56	RB
12	348- 358	13.92- 14.32	SR
13	369- 379	14.76- 15.16	Y
14	389- 399	15.56- 15.96	ZR
15	412- 426	16.48- 17.04	MS*
16	521- 537	20.84- 21.48	PD
17	544- 560	21.76- 22.40	AG
18	568- 584	22.72- 23.36	CD
19	597- 613	23.88- 24.52	IN
20	623- 639	24.92- 25.56	SN
21	657- 664	26.28- 26.56	SB
22	790- 808	31.60- 32.32	BA
23	827- 845	33.08- 33.80	LA

* Mo Kα scatter

EXCITATION CONDITION: 2
ANODE: MO
FILTER: --
VOLTAGE: 15
CURRENT: 200
ENERGY:0- 10

SPECTRUM REGIONS OF INTEREST

1	118- 132	1.18- 1.32	MG
2	141- 155	1.41- 1.55	AL
3	167- 181	1.67- 1.81	SI
4	193- 209	1.93- 2.09	P
5	324- 338	3.24- 3.38	K
6	365- 376	3.65- 3.76	CA
7	631- 649	6.31- 6.49	FE

EXCITATION CONDITION: 3
ANODE: W
FILTER: CU
VOLTAGE: 35
CURRENT: 200
ENERGY:0- 20

SPECTRUM REGIONS OF INTEREST

REGION	CHANNEL	ENERGY	ELEMENT
1	112- 120	2.24- 2.40	S
2	127- 135	2.54- 2.70	CL
3	162- 170	3.24- 3.40	K
4	180- 190	3.60- 3.80	CA
5	221- 231	4.42- 4.62	TI
6	243- 253	4.86- 5.06	V
7	266- 276	5.32- 5.52	CR
8	290- 300	5.80- 6.00	MN
9	313- 326	6.26- 6.52	FE
10	520- 534	10.40- 10.68	AS
11	585- 605	11.70- 12.10	BR
12	620- 640	12.40- 12.80	PB

Finally, the corrected counts are divided by analysis live time, L, to obtain the count rate,

$$I_i = \frac{T_i}{L} \qquad (10)$$

and $$\sigma I_i = \frac{\sigma T_i}{L} \ . \qquad (11)$$

Calculations for instrument calibration are similar except that C_i is solved for in eq. 3. Also, since single element and non-interfering multi-element standards are used for calibration, spectral corrections are not made and $T_i = N_i$ and $\sigma T_i = \sigma N_i$.

7. Quality Control

The filters are loaded and unloaded into specially machined acrylic holders. Filter loading is done in the laminar flow hood and the filters themselves are handled with forceps, out of the analysis and deposit area. The loaded filters are transported to and from the TEFA in covered sample cases, and the filter holders are cleaned between each use. These procedures prevent the possibility of sample contamination.

To prevent confusion in identification of the samples when they are out of their ID coded filter containers, a sample position number versus ID number relationship used. This relationship is established by the XRF LOG before the filters are removed from their containers and it is verified after each handling step in the procedure.

For each XRF analysis batch of 10 samples, one blank and a quality control standard is analyzed. Measured concentrations of the quality control standard, which contains several key elements, are compared with actual concentrations (Figure 4). If the deviation is more than ± 2%, all samples of that run must be reanalyzed. The results of the quality control standard over a number of runs provides a measure of the XRF analysis precision. If the results show a trend in drift, recalibration is required.

Several elements, including K, Ca, Fe, As, Br and Pb are measured under more than one of the three excitation conditions normally used for each run. Results of these elements are compared for each of the excitation conditions under which they are measured. If agreement is for outside the calculated uncertainties, the sample must be reanalyzed.

Figure 4

```
PERT EAST 8
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   41.19+-  2.07      1.0
CR    44.30   44.79+-  2.25      1.1
FE    44.90   44.85+-  2.26   -  0.1
NI    47.30   47.05+-  2.36   -  0.5
ZN    44.80   44.89+-  2.25      0.2
CD    49.70   49.50+-  2.53   -  0.4
```

```
FRTEAST9
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   41.23+-  2.07      1.1
CR    44.30   44.92+-  2.25      1.4
FE    44.90   45.09+-  2.27      0.4
NI    47.30   46.94+-  2.36   -  0.8
ZN    44.80   44.80+-  2.25      0.0
CD    49.70   49.66+-  2.53   -  0.1
```

```
FRTEAST10
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   40.99+-  2.06      0.5
CR    44.30   44.99+-  2.26      1.6
FE    44.90   45.39+-  2.28      1.1
NI    47.30   47.05+-  2.36   -  0.5
ZN    44.80   44.94+-  2.25      0.3
CD    49.70   49.42+-  2.52   -  0.6
```

```
ERT EAST 11
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   40.91+-  2.05      0.3
CR    44.30   44.57+-  2.23      0.6
FE    44.90   45.03+-  2.27      0.3
NI    47.30   47.07+-  2.36   -  0.5
ZN    44.80   44.76+-  2.25   -  0.1
CD    49.70   49.03+-  2.50   -  1.3
```

```
ERT EAST 12
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   40.82+-  2.05      0.1
CR    44.30   44.75+-  2.24      1.0
FE    44.90   44.62+-  2.24   -  0.6
NI    47.30   46.63+-  2.34   -  1.4
ZN    44.80   44.22+-  2.22   -  1.3
CD    49.70   49.33+-  2.52   -  0.7
```

```
ERT EAST 13
QA STANDARD QS043
EL      CONCENTRATION       % ERROR
    ACTUAL       MEASURED
TI    40.80   41.05+-  2.06      0.6
CR    44.30   44.80+-  2.25      1.1
FE    44.90   44.96+-  2.26      0.1
NI    47.30   46.97+-  2.36   -  0.7
ZN    44.80   44.76+-  2.25   -  0.1
CD    49.70   49.70+-  2.54   -  0.0
```

8. Quality Assurance

Calibration of the instrument is by thin film standards prepared by Micromatter, Inc., Eastsound, WA., and by solution deposited and particle standards made by Columbia Scientific Industries, Austin, TX. Plots of instrument response versus atomic number should yield smooth curves, and are used to validate standard concentrations.

Interlaboratory comparisons are used to check accuracy of the instrument calibration. Several techniques have been used in interlaboratory comparisons in addition to energy dispersive x-ray fluorescence, including neutron activation analysis, optical spectroscopy, wavelength dispersive x-ray fluorescence, and ion chromotography.

In house intermethod comparison with neutron activation analysis is done routinely. This independent method provides comparison with XRF on about 20 elements.

Results from each analysis run are reviewed by the laboratory supervisor. The inter-excitation and quality control standard results are checked as described in section 7. The laboratory supervisor must initial the XRF LOG before results of that run are considered valid. Periodic audits of the TEFA startup, filter loading and unloading, analysis, and TEFA shutdown procedures insure compliance with the Standard Operating Procedure.

NEUTRON ACTIVATION ANALYSIS

STANDARD OPERATING PROCEDURE

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- II. Apparatus
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- III. Counting Conditions

- IV. Reagents and Materials
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- VII. Procedures for Preparing Loaded Samples for Irradiations

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- IX. Procedures for Unloading Intermediates and Long Samples for Counting

- X. Procedures for Counting Intermediates and Longs

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NEUTRON ACTIVATION ANALYSIS

STANDARD OPERATING PROCEDURE

I. General Discussion

A. Principle: The elements of a specimen when placed in a neutron flux from a nuclear reactor will absorb neutrons and undergo nuclear transmutations forming radioactive elements which emit radiations characteristic of that specific radionuclide. Since the number of these radioactive elements formed is proportional to the number of original stable element atoms present, a measure of the number of specific radionuclide's radiations is an indirect quantitative measure of the stable elements concentration. A simple comparison of the specific radioactivity produced from a standard and an unknown is usually adequate for a quantitative analysis.

B. Interferences: Neutron activation interferences take the form of 1) competing reactions and 2) spectral interferences; the latter of which are negligible when using Ge (Li) gamma-ray spectrometers. Competing reactions such as n,p and n,α reactions are potential problems which can be considered in the calculations or minimized by using standards with a composition similar to the sampled aerosol.

II. Apparatus

A. Reactor: Reed College Triga Mark I reactor was used for all irradiations. For shorts the Rabbit system, a pneumatic transfer system, was used. The neutron flux in the Rabbit is 5×10^{12} $n/cm^2/$ sec. For irradiations longer than 10 minutes the Lazy Susan, a 40 position rack, which rotates about the core of the reactor, is used. The flux in the Lazy Susan is $2 \times 10^{12} n/cm^2/sec$. The rack rotates to insure an homogeneous flux to all samples.

B. Counting Equipment: A hyper-pure germanium detector with a resolution of 1.64 KeV and an intrinsic efficiency of 17% coupled to an Ortec 546 spectroscopy amplifer and a Norland 4096 channel multichannel analyzer are used for counting all specimens.

III. Counting Conditions

There are three main counting conditions: Shorts, isotopes with half lives from minutes to hours; intermediates, isotopes with half lives ranging from 10 hours to several days; and longs with half lives greater than several days. The following conditions are used for each analysis:

Shorts: 5 minute irradiation, 10 minute decay, 5 minute count

Intermediates: 8 hour irradiation, 2 day decay, 15 minute count

Longs: 8 hour irradiation, 30 day decay, 1 hour count

It should be noted that these conditions have been optimized to obtain as many elements as possible and that by adjusting the irradiation time, decay time and counting time the sensitivity for some elements can be increased.

IV. Reagents and Materials

A. Specimen envelopes: 0.5 mil polyethylene (Safeway brand®) has been shown to have acceptable blank levels for this application. Each new batch of polyethylene is tested for blank levels before use.

B. Standard Reagents: Gravimetrically prepared solutions of KCl, NaCl, KBr, plus National Bureau of Standards urban particulate matter, Orchard Leaf, Fly Ash, Coal 1632A, and USGS Standards AGU-1, BCR-1, GSP-1, soil-S are used as both calibration standards and quality assurance standards.

V. Preparation of Standards

A. Liquid Standards

1. Dry all reagents in an oven at 105° C. for 1 hour. Remove and cool in a desiccator for 1 hour.

2. Take a clean piece of weighing paper and place on the balance and record the tare weight in the standards notebook.

3. Add the desired amount of reagent and record the weight in the standards notebook, determine the net weight of standard and record in the standards notebook.

4. Remove the weighing paper from the balance. Transfer the standard from the weighing paper to a clean 100 ml volumetric flask using a clean, dry funnel. Rinse the weighing paper and the funnel with deionized water to insure that all the standard is transferred.

5. Fill the volumetric flask to approximately 3/4 its volume and dissolve the standard. Let solution return to 20° C. ± 5° and fill to the line using a dropper.

B. Powdered Standards

1. Dry all reagents for 1 hour at 105° C. and place in desiccator to cool for 1 hour.

2. Cut a 2 inch by 2 inch piece of polyethylene and place on the Cahn electrobalance.

3. Record the tare weight on the standard weigh sheet.

4. Add the desired amount of powdered material and fold it in the polyethylene and weigh. Record the weight on the data sheet and remove from the balance.

5. Place the standard and polyethylene back on the balance and reweigh. Record the weight on the data sheet. If the difference between the first weight and the second is greater than 20 micrograms, the standard shall be considered void and disposed of.

6. Seal the standard in a polyethylene envelope and place in a clean 2/5 dram polyvial and label the polyvial with the correct ID.

IV. Sample Loading

A. Preparation of Work Area and Materials

1. Clean the surface of the laminar flow hood with methanol and a kaydry towel.

2. Place a clean kaydry towel on the surface of the laminar flow hood to be used as a work surface.

3. Then assemble the following items:

   a) stainless steel scissors;
   b) 2 pairs of teflon covered tweezers;
   c) 1 pair of stainless steel pointed tweezers;
   d) the plastic material;
   e) heat sealer;
   f) clean 2/5 dram polyvials;
   g) black marking pen;
   h) plastic gloves (disposable).

4. Put on gloves and with methanol and kimwipe clean the above items.

5. Before proceeding, clean gloves on your hands with methanol and kaydry towel.

6. Unwrap the plastic wrap and wind off the outside 12 inches of material. Cut off the 12 inches of material and dispose of it.

7. Place down a clean kimwipe.

B. Procedures for Loading Filters

1. Cut off a piece of plastic approximately 1½ inches by 1½ inches square.

2. Place the plastic square on the kimwipe.

3. Get the Petrislide containing the sample to be loaded.

4. Get a clean 2/5 dram vial and write the ID of the sample on the 2/5 dram vial. Then set it aside.

5. Open Petrislide. With teflon tipped tweezers, remove sample from the Petrislide and place it upside down on the plastic square.

6. With one pair of teflon tweezers, press down on the plastic ring of the sample. With the other pair of tweezers, rub them along ring. This should cause the filter to begin to separate from the ring. Once the filter is partially removed from the ring, pick the ring up with one pair of tweezers and with the other pair of tweezers grab the filter near the ring and pull gently. This should cause the filter to peel off the ring.

7. Place the filter on the plastic. With a pair of tweezers grab the filter on the unexposed side and try to make the filter fairly small.

8. Fold the plastic over the filter. Using tweezers, fold the wrap and filter to an area of approximately 5 square millimeters.

9. With the heat sealer, trim off the excess plastic.

10. Place the filter in the labeled 2/5 dram vial.

11. Cut the tabs off the lid of the 2/5 dram vial.

12. Throw away kimwipe which was placed on kaydry towel.

13. Clean the forceps with methanol and kimwipe.

14. Repeat steps 1 through 13 until all filters are loaded.

15. The plastic wrap is to be wrapped with a kaydry towel and a rubber band placed over the kaydry to hold it in place.

16. All samples and the bag labeled with the appropriate information are to be put in playtex bottle liners and heat sealed.

17. Clean all materials used and put away in appropriate places.

VII. Procedures for Preparing Loaded Samples for Irradiations

A. Obtain a sample loading sheet from the data sheet notebook.

B. Record the flux monitor number, sample ID in the appropriate column.

C. Every 10 to 15 samples insert a quality assurance standard.

D. Repeat steps B & C until all samples are loaded.

E. Recheck each of the flux monitor IDs and sample IDs against the data sheet and the master log to assure that no mix ups have occurred and that all samples are present.

VIII. Procedures for Running Shorts

A. Rabbit Area

1. Place clean paper on work area outside of the Rabbit hood.
2. Make sure the blue radiation detector is on and placed inside hood near Rabbit terminus.
3. Check samples in polyvials, both large and small polyvials, against INAA3 data sheets to insure correct sample and copper flux monitors are used.
4. Check to see there are kimwipes and methanol in the work area.
5. Set Rabbit motor clock to 5 minutes. (Turn knob on clock all the way to the right.)
6. Set clock in Rabbit area to correct time to ± 1 sec.
7. Go to reactor operator and ask for ion chamber survey meter. Check battery and place it in the hood in the the Rabbit.

B. Counting Room

1. Open door and prop it open.
2. Turn up thermostat behind counter to 78° C.

3. a) Check to make sure the printer and tape deck are attached to the M.C.A. correctly

   NEVER ATTACH THE BP-10 (white connector) WHICH GOES DIRECTLY INTO THE M.C.A. WHILE THE POWER IS ON.

   b) Make sure the line printer dip switch is on.

4. Place windows into detector.

   a) Push both cursor buttons simultaneously until the writing on the bottom of screen disappears.

   b) Place the tape which contains the windows for day in the tape deck.

   c) Place the mode switch to the "serial in" position.

   d) Push the "I/O" button on the M.C.A. and then place the tape deck into the "play" mode.

   e) Wait until the M.C.A comes out of the "I/O" mode and shut off the tape deck and push both cursor buttons until writing appears on the M.C.A. screen.

   f) Check the windows against the windows listed in the blue notebook on the shelf.

   g) Check M.C.A. to see if all the switches are in the correct position.

      i) Control Region

         aa) Mode--Intergal

         bb) Memory--Full

         cc) Vertical Scale--Log

         dd) Preset--A 100
                     B 3

         ee) Add/Sub Toggle--Add

         ff) Live/Clock Toggle--Live

      ii) Display Region--Nothing is to be adjusted here.

      iii) Analog to Digital Converter

         aa) LLD--0.3

         bb) ABC Light on

cc) BLR Light off

dd) 4096 Light on

iv) Amplifier

aa) Course gain--20

bb) Shaping time--6 msec.

cc) BLR/Thres Toggle--BLR

dd) Delay--out

ee) Pos/Neg Toggle--Pos

ff) Gain--see next Step 4

gg) Bias = 3000 volts

5. Calibration of Analyzer

a) Get the Co ^{60} source (in gold can) from the Rabbit area.

b) Place on the detector and push "collect" button.

c) Push the "collect" button after ~10 sec. and move the cursor to the largest peak on the right. Note center of the peak. It should be channel 1710. If it is not ± 0.5 channels, adjust amplifier gain up or down depending on if the peak centroid is high or low. Repeat this step until center of peak is at 1710.

d) Check the other peaks and see if they are at 1505.8 and 849.

e) If not, call supervisor at NEA, Inc.

IX. Procedures for Unloading Intermediates and Long Samples for Counting

A. Obtain an unloading data sheet from the data sheet notebook.

B. Obtain the loading data sheet from the project notebook.

C. Check that the data on the loading sheets is the same as the samples to be unloaded.

D. Write the ID of the first sample to be unloaded on the unloading sheet.

E. Then remove the sample to a clean 2/5 dram polyvial.

F. Close the polyvial and cut the wings off the cap.

G. Repeat steps 4-6 until all samples and unloaded.

X. Procedures for Counting the Longs

A. Routine counting

1. Selected standards are to be counted first on both detectors, and placed back in the packet from which it originally came. They are also to be counted last. They will be counted 3 times.*

2. All samples are to be counted in the order they appear on the loading list. This includes the standards!

3. The blanks are to be counted on both detectors and are to be counted after the standards in #1.

4. The sample ID will be logged on the data sheet both before the sample is placed in the detector and after it is removed. Upon removing the sample, the sample ID on the loading sheet will be crossed out with a felt pen.

5. All blank spaces on the data sheet will be filled in.

6. All unusual items will be noted in the comment section, i.e.,

   a) Sample fell over while counting--(sample should be recounted)
   b) Power failure
   c) Clock stopped
   d) When the tape is changed

7. The person who initials appear on the line is responsible that the line of data is correct.

8. The windows are to be checked daily, once in the morning at the start up and once in the afternoon.

9. The count time = 5000 sec.

10. The energy calibration is

    Co 1332.5 Kev peak is at channel 2970
    1172.5 Kev peak is at channel 2615
    662.5 Kev peak is at channel 1475
    There is a peak at 197 also.

---

* The cobalt source is the one in the gold can.

B. Start up in the morning and counting procedures

1. Place the tape recorders in the record mode (if off): Record, play, pause.
2. Turn on the line printer (if off).
3. Output the data from the previous sample and record all of the data.
4. Get a new data sheet, fill in the project title and the date. Make sure it is the correct date! Then place the correct page number.
5. Get the next sample to be counted, check its ID with that of the next sample on the loading sheet.
6. Place it on the detector in an upright position.
7. Place lead brick in place.
8. Push the "collect" button to begin the analysis and note the time and percent dead time. Record them on the log sheet.
9. If the percent dead time is greater than 25%, remove the sample and place in a bag to be counted later.
10. When the sample is finished counting, the value of the cobalt intergal is to be recorded on the log sheet (cursor on 3760).
11. Note the cassette tape position, release the recorder from the "pause" mode then hit the "I/O" button on the M.C.A. A buzz should come from the recorder and the line printer should begin to write data. Once the noise from the recorder stops, place the recorder in the "pause" mode again.
12. After the line printer finishes the sample, ID should be placed on the output.
13. The lead brick should be removed and it should be noted if the sample is still in an upright position. If it is not it should be noted in the comments section of the data sheets, and the sample recounted.
14. Remove the sample, check its ID with the loading sheet; if it is correct, place it in the "has been counted" baggie, and with a felt pen, cross it off of the loading sheet.
15. If the sample ID is not correct, remedy the situation by logically retracing your steps with the help of the data sheets. If no logical answer can be found, recount the samples back until you feel confident that the data is correct.

16. At the end of your shift you are to compare the data sheet with the loading sheet to make sure all samples have been counted, that the IDs are correct, and that the time looks reasonable (approximately 1 hour between samples).

C. Procedures for labeling cassette tapes

1. All tapes and tape boxes will be labeled before they are placed in the tape recorder.

2. The following format will be used:

   K - Detector (# side of the tape) - Project - Data Set

   K = either (I) for intermediate
   or (L) for long

   Detector = either (A) for detector A
   or (B) for detector B

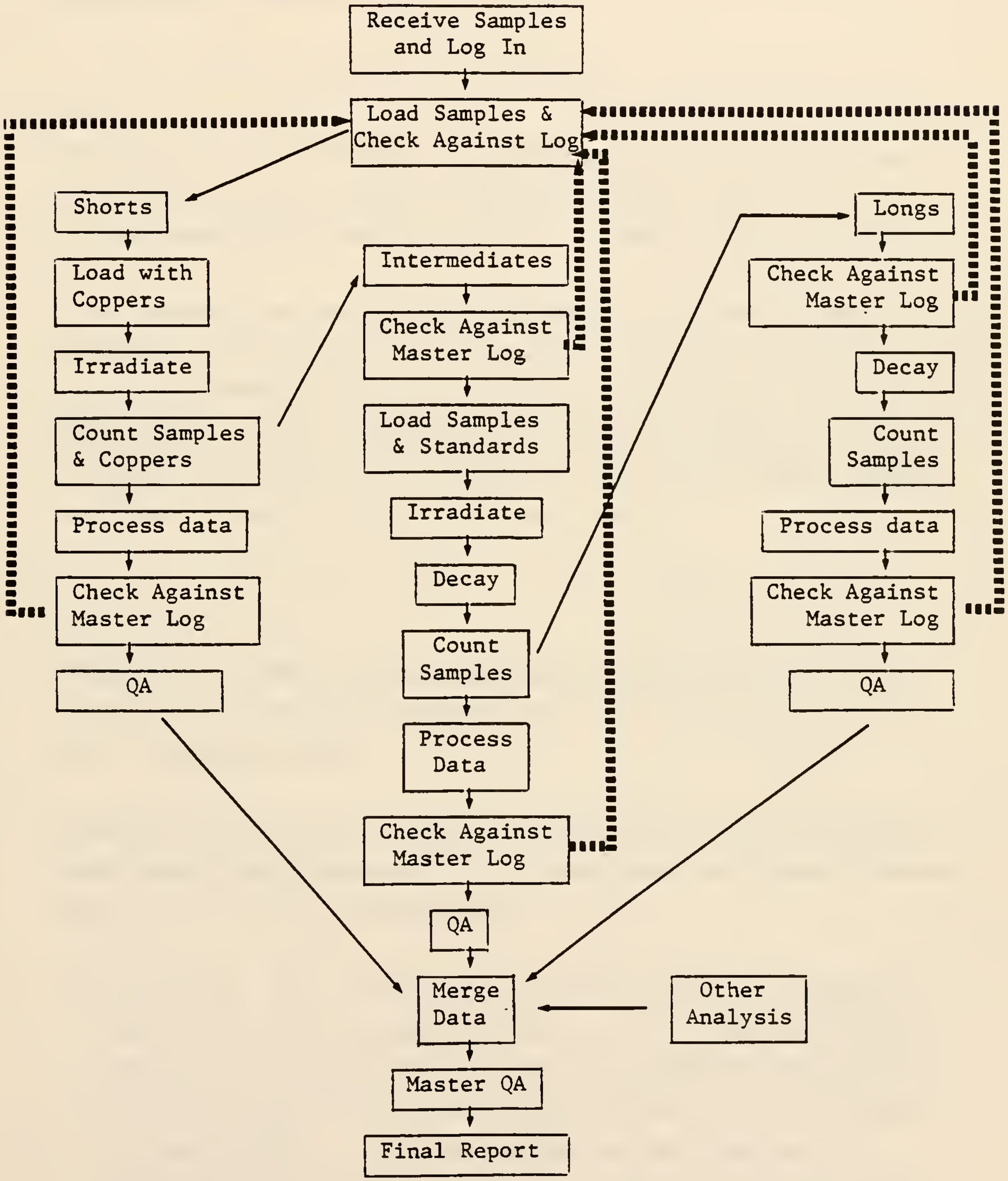
   # = The side of the tape; side A of tape 1 = 1; side B of tape 1 = 2; side A of tape 2 = 3; side B of tape 2 = 4; etc.

3. The data will be entered under the above tape title.

4. Whenever a tape is changed, it should be noted in the comment column of the data sheet.

XI. Analysis Flow Diagram

The following flow chart illustrates the data management system for neutron activation.



XII. Calculations

The activity A_i, of element i upon removal from the reactor after t minutes of irradiation is

$$(1) \quad A_i = k_i \, \phi \, m_i \, (1 - e^{-\lambda_i t})$$

where k_i is a proportionality constant, m_i is the mass of element i in the sample, λ_i is the decay constant of radionuclide i, and ϕ is the average neutron flux encountered by the sample during irradiation.

After removal from the reactor, the sample is allowed to decay for t_1 minutes, then counted until t_2 minutes. The number of counts (normalized to a common shelf) detected, N_i, is proportional to the number of radionuclide i atoms decaying in the interval between t_1 and t_2, the original activity, and the fraction* of the total counting interval actually processed by the Multichannel analyzer,

$$(2) \quad N_i = GA_i \, (e^{-\lambda i t_1} - e^{-\lambda i t_2}) \left(\frac{t_L}{t_2 - t_1}\right)$$

where G is a proportionality constant determined by the detector efficiency and detector-sample geometry and t_L is the preset "live time" counting period.

Standards which contain a fraction f_i of element i and of measured total mass m_s are irradiated for an equal time, and counted between times t_1^s and t_2^s after irradiation.

* In reality, this fraction does not remain constant throughout the "real time" counting interval, $t_2 - t_1$. However, computer simulations indicate that the error introduced by assuming eq. (2) to be exact is less than 1% for the shortest lived element, Al, when $\frac{t_L}{t_2 - t_1} < .875$ for typical aerosol samples. By limiting the initial dead time to < 23% when counting starts, this condition is always met.

Analogous to eq. (2), the net number of counts measured is

$$(3)\quad N_i^s = G\ k_i\ \emptyset^s f_i m_s\ (1 - e^{\lambda_i t})\ (e^{\lambda_i t_1^s} - e^{\lambda_i t_2^s})\ \left(\frac{t_L^s}{t_2^s - t_1^s}\right)$$

where the s superscript indicates quantities unique to the standard.

Dividing eq. (1) by eq. (3) and cancelling like quantities yields

$$(4)\quad \frac{N_i}{N_i^s} = \frac{\emptyset}{\emptyset^s}\ \frac{m_i}{f_i m_s}\ \frac{(e^{-\lambda_i t_1} - e^{-\lambda_i t_2})}{(e^{-\lambda_i t_1^s} - {}^{-\lambda_i t_2^s})}\ \frac{\left(\dfrac{t_L}{(t_2 - t_1)}\right)}{\left(\dfrac{t_L^s}{(t_2^s - t_1^s)}\right)}$$

The flux ratio, $\frac{\emptyset}{\emptyset^s}$, is determined from the copper foil flux monitors of known mass. This ratio is:

$$(5)\quad \frac{\emptyset}{\emptyset^s} = \frac{N_c}{N_c^s}\ \frac{m_c^s}{m_c}\ \frac{e^{-\lambda_c t_{c_1}^s}}{e^{-\lambda_c t_{c_1}}}$$

where the subscript c refers to quantities associated with the flux monitors; eq. (4) is solved for m_i and incorporating eq. (5)

$$(6)\quad m_i = f_i m_s\ \frac{N_i}{N_i^s}\ \frac{N_c^s}{N_c}\ \frac{m_c}{m_c^s}\ \frac{e^{-\lambda_c t_{c_1}}}{e^{-\lambda_c t_{c_1}^s}}\ \frac{\left(\dfrac{t_L^s}{(t_2^s - t_1^s)}\right)}{\left(\dfrac{t_L}{t_2 - t_1}\right)}\ \frac{(e^{-\lambda_i t_1^s} - e^{-\lambda_i t_2^s})}{(e^{-\lambda_i t_1} - e^{-\lambda_i t_2})}$$

Eq. (6) will be used to determine the mass of element i from the observed parameters.

The relative standard deviation will be determined by adding significant contributions in quadrature

$$(7)\quad \frac{\sigma_{m_i}}{m_i} = \left[\frac{\sigma^2_{m_c}}{m_c^2} + \frac{\sigma^2_{m^s_c}}{m^{s2}_c} + \frac{\sigma^2_{m_s}}{m_s^{\,2}} + \frac{\sigma^2_{N_i}}{N_i^{\,2}} + \frac{\sigma^2_{N^s_i}}{N^{s2}_i} + \frac{\sigma^2_{N_c}}{N^2_c} + \frac{\sigma^2_{N^s_c}}{N^{s2}_c} \right]^{\frac{1}{2}}$$

The relative contribution to the uncertainty of the exponential terms is insignificant for the elements under consideration.

XIII. Quality Assurance

A. USGS and NGS standards will be analyzed as unknown with each group as a check on the analysis.

B. The same samples will be analyzed by XRF for some of the same elements as obtained by INAA. Bromine, for example, will be measured with high precision with both methods and should serve as an excellent cross check.

C. The samples receiving various irradiation will have cross check with elements measured in different conditions. Sodium, for example, is measured by shorts and intermediates.

Standard Operating Procedure

Dilution Source Sampling

1. General Discussion

The primary objective for dilution source sampling is the collection of representative, uncontaminated, size-classified samples of stack particles after cooling and dilution with ambient air has occurred. The parameters which must be quantified are listed in Table 1. The size categories which are collected with the system are $<2.5\mu$ and $>2.5\mu$. Standard teflon membrane filters are used for sample collection with a Sierra Dichotomous Sampler interfaced with the dilution chamber. Dilution ratios of $\geq$ 20:1 are used. Filtered ambient air is used for dilution. Stack aerosol is removed isokinetically from the stack with standard buttonhook nozzles. A sample is removed isokinetically from the dilution chamber by the dichotomous sampler head fitted with one of a number of interchangeable inlets of various diameters. The teflon filter samples are handled, shipped and stored employing the same standard operating procedures as are used for ambient samples collected with a dichotomous sampler.

2. Equipment

A. NEA Dilution Sampling System
B. Preloaded filters in filter cassetts and plastic petri dishes
C. Sample transport boxes
D. Pitot tube and manometer
E. 60" bi-metal thermometer

3. Sampling Procedures

A. Measure stack gas velocity at point of sample collection with a pitot tube and monometer.
B. Measure stack temperature at point of sample collection with a bi-metal thermometer.
C. Select a buttonhook nozzle inlet diameter and a pressure drop value between the inside of the stack and the inside of the dilution chamber to provide the desired volumetric and isokinetic flows. The pressure drop is defined by equation 1. The selection of an appropriate nozzle diameter, pressure drop and flow within the dilution chamber for a given stack gas velocity and dilution ratio is made from calibration charts 1-8.

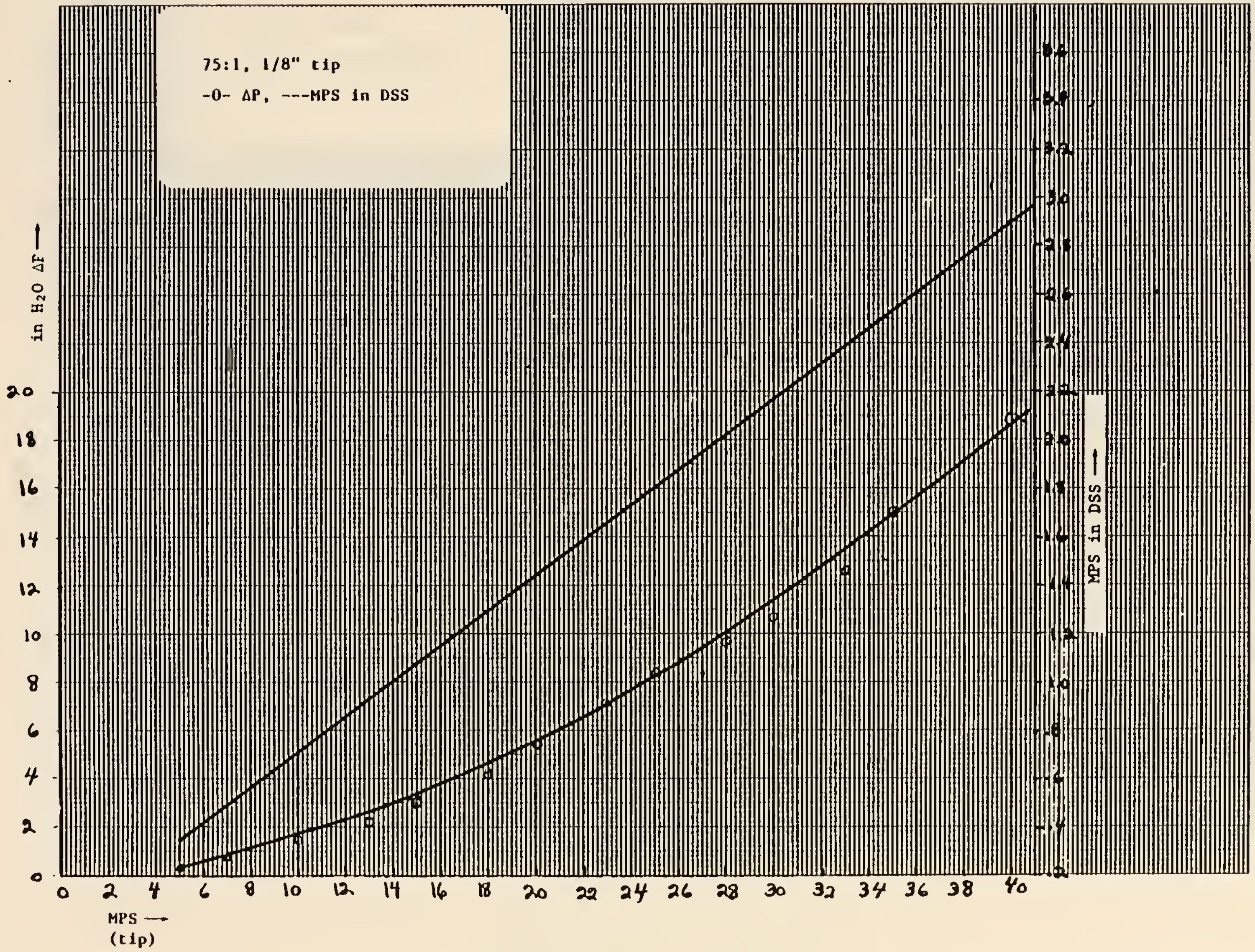
$$\Delta P = P_{s,s} + \tfrac{1}{2}\,\rho_s V_s - P_{d,s}, \qquad (1)$$

where, $P_{s,s}$ is the static pressure within the stack,
ρ_s is the density of gas within the stack,
V_s is the linear velocity of gas within the stack, and
$P_{d,s}$ is the static pressure within the dilution chamber.

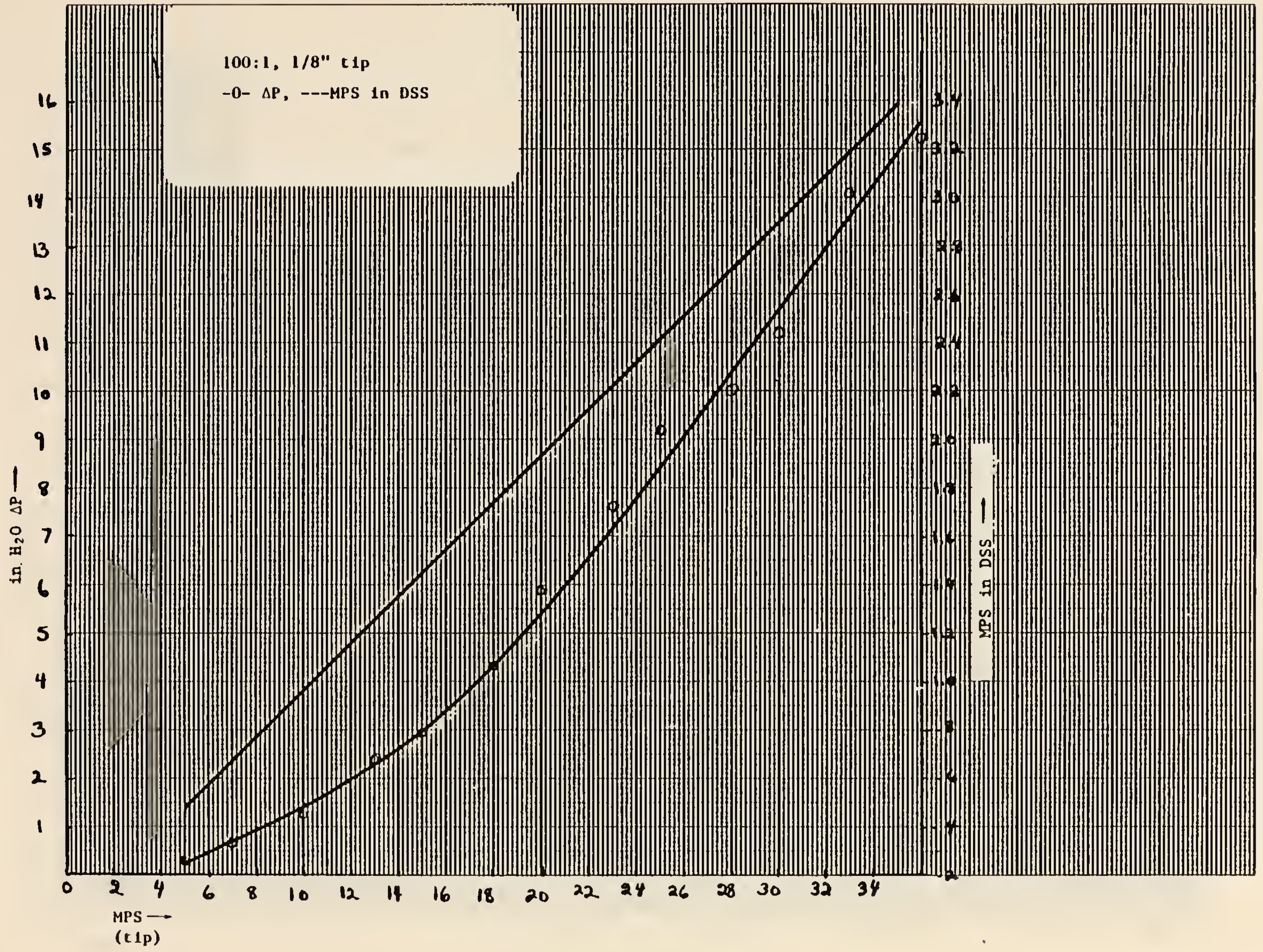
Table 1

Dilution Sampling System - Parameters

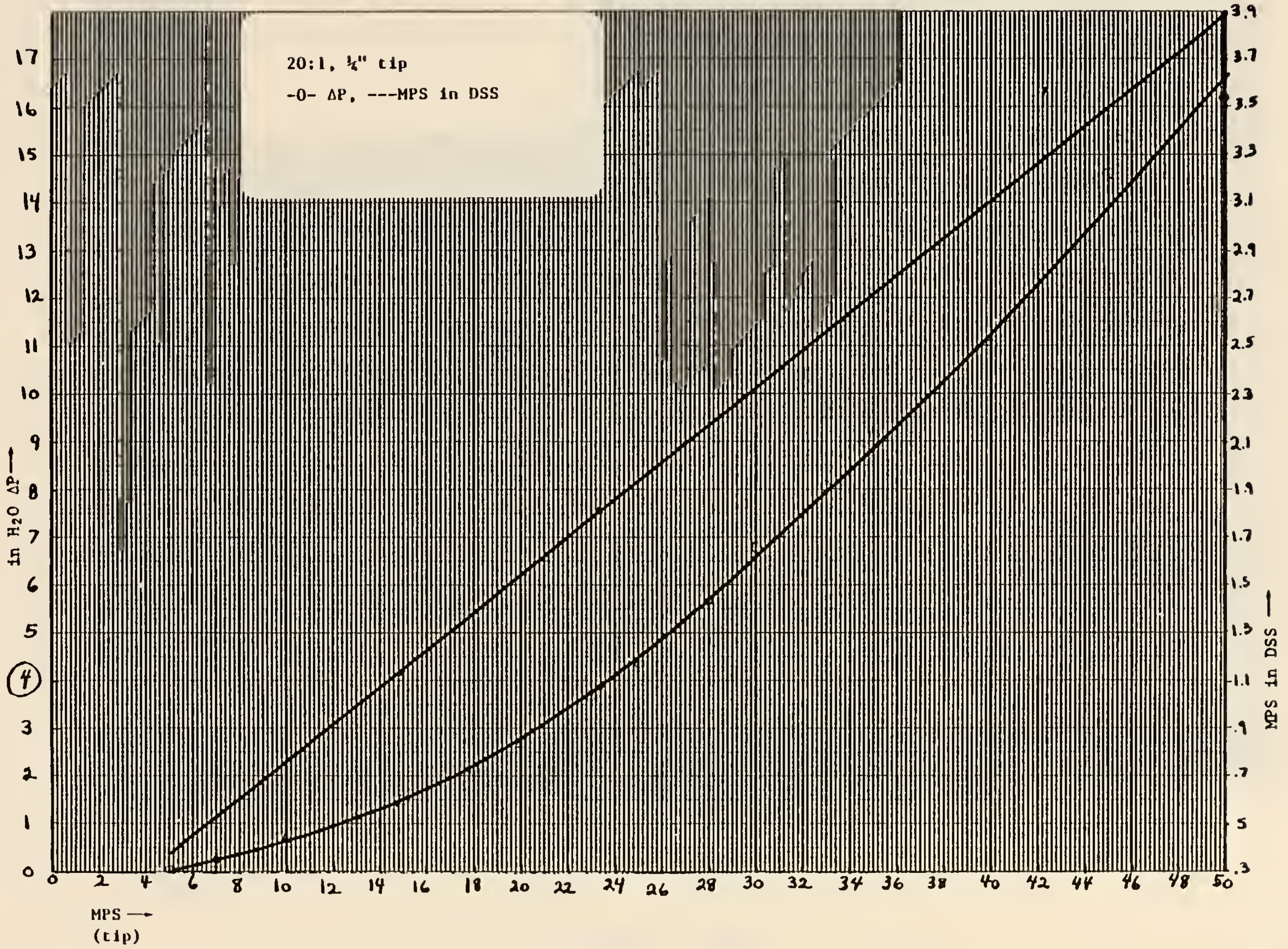
Parameter	Method of Measurement	Accuracy	Precision
In-stack Gas Velocity at Point of Sample Collection	Pitot tube/manometer	± 5%	± 10%
Dilution Chamber Gas Velocity	Thermal anemometer	± 10%	± 20%
Sampling Nozzle Gas Velocity	In-stack total pressure sensor, dilution chamber static pressure sensor and MAGNEHELIC gauge	± 10%	± 20%
Dichotomous Sampler Gas Velocity	Rotometers	± 5%	± 10%
Sampling Nozzle Diameter	Micrometer	± .02 in. (.51 mm)	NA
Dichotomous Inlet Diameter	Micrometer	± .02 in. (.51 mm)	NA
In-stack Temperature at Point of Sample Collection	Bi-metal thermometer	± 1% F.S.	± 5^{o} C
Ambient Temperature	Bi-metal thermometer	± 1% F.S.	± 2^{o} C
Dilution Chamber Temperature	Bi-metal thermometer	± 1% F.S.	± 2^{o} C



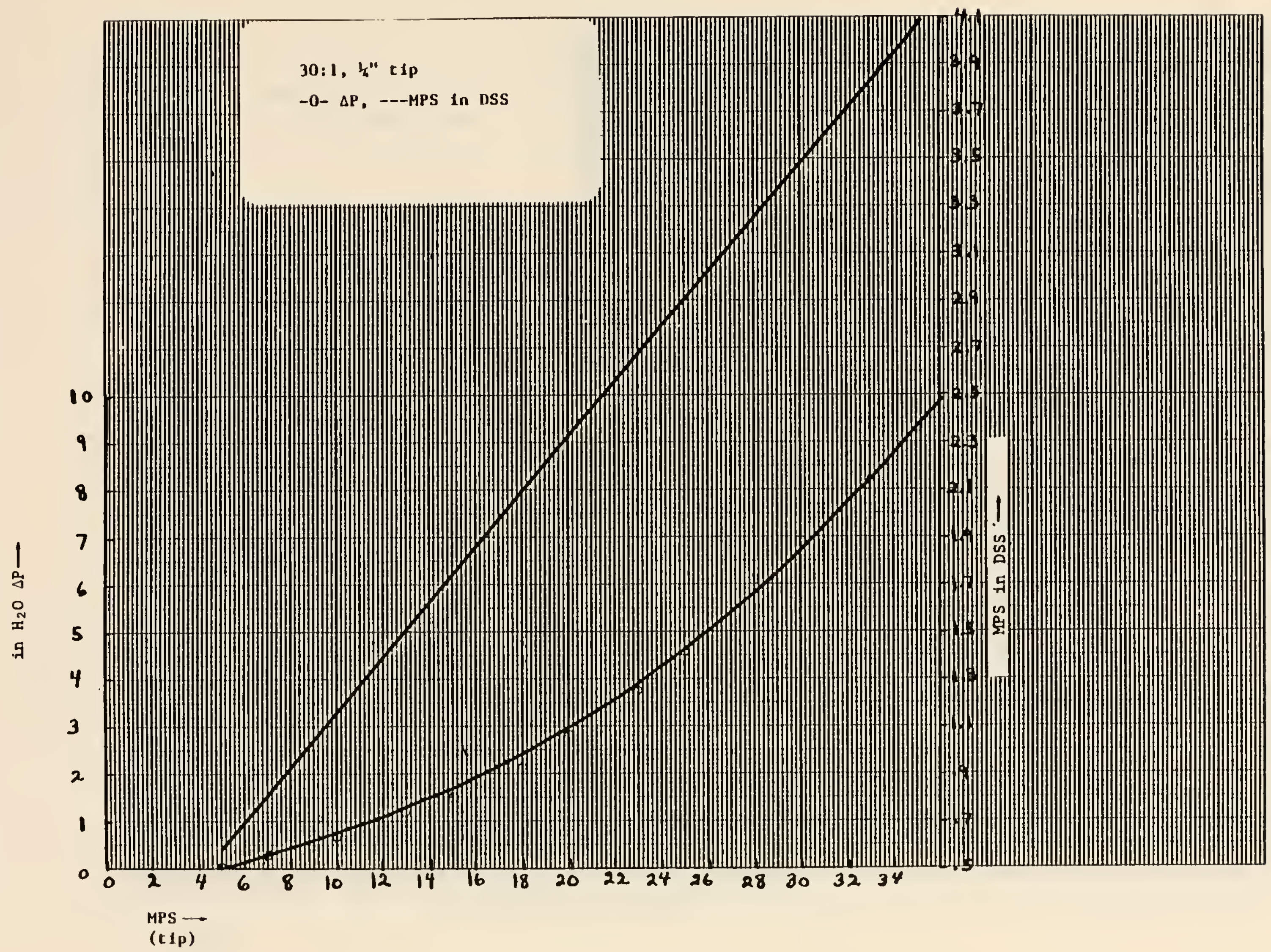
Calibration Chart 1



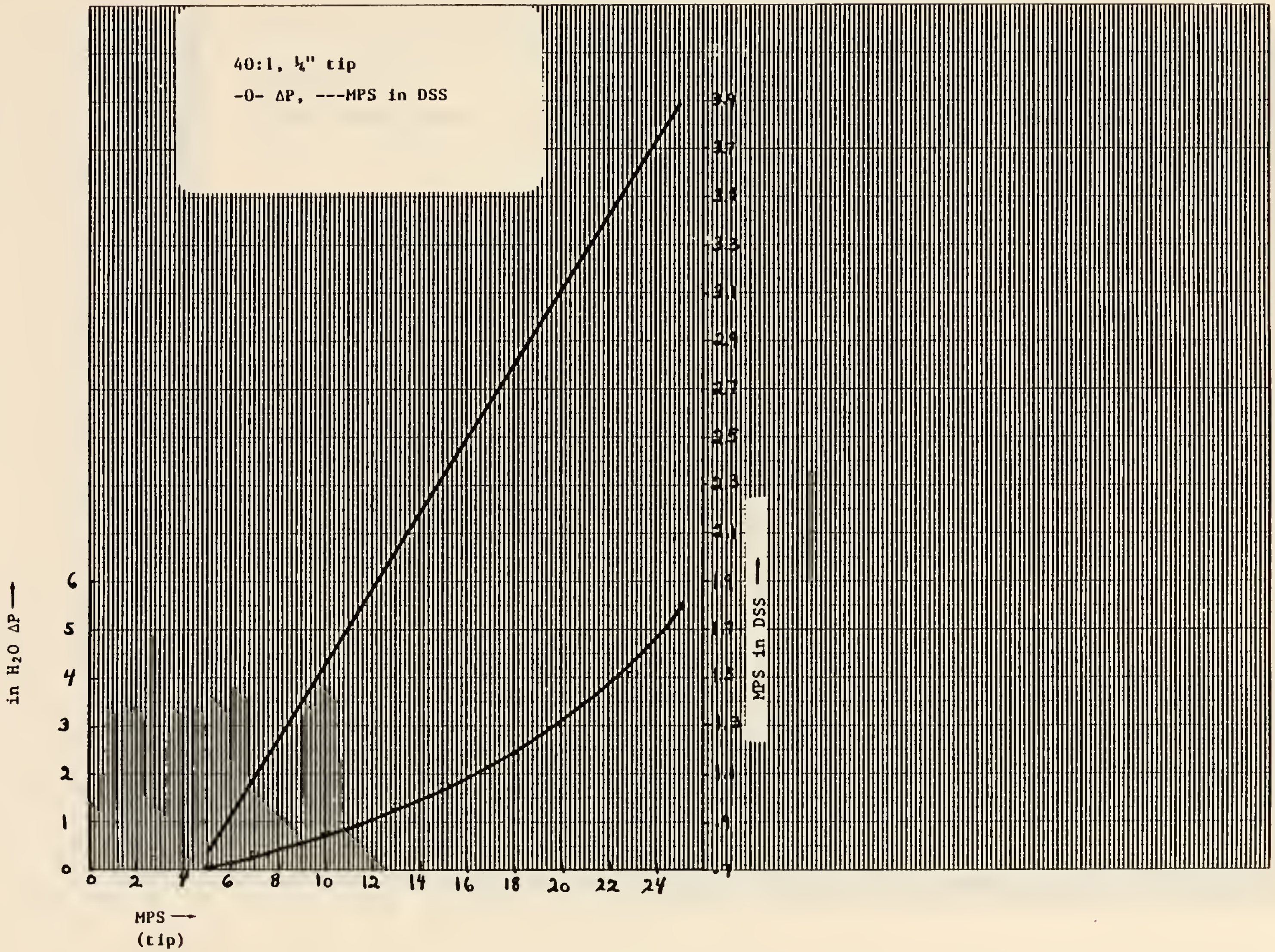
Calibration Chart 2



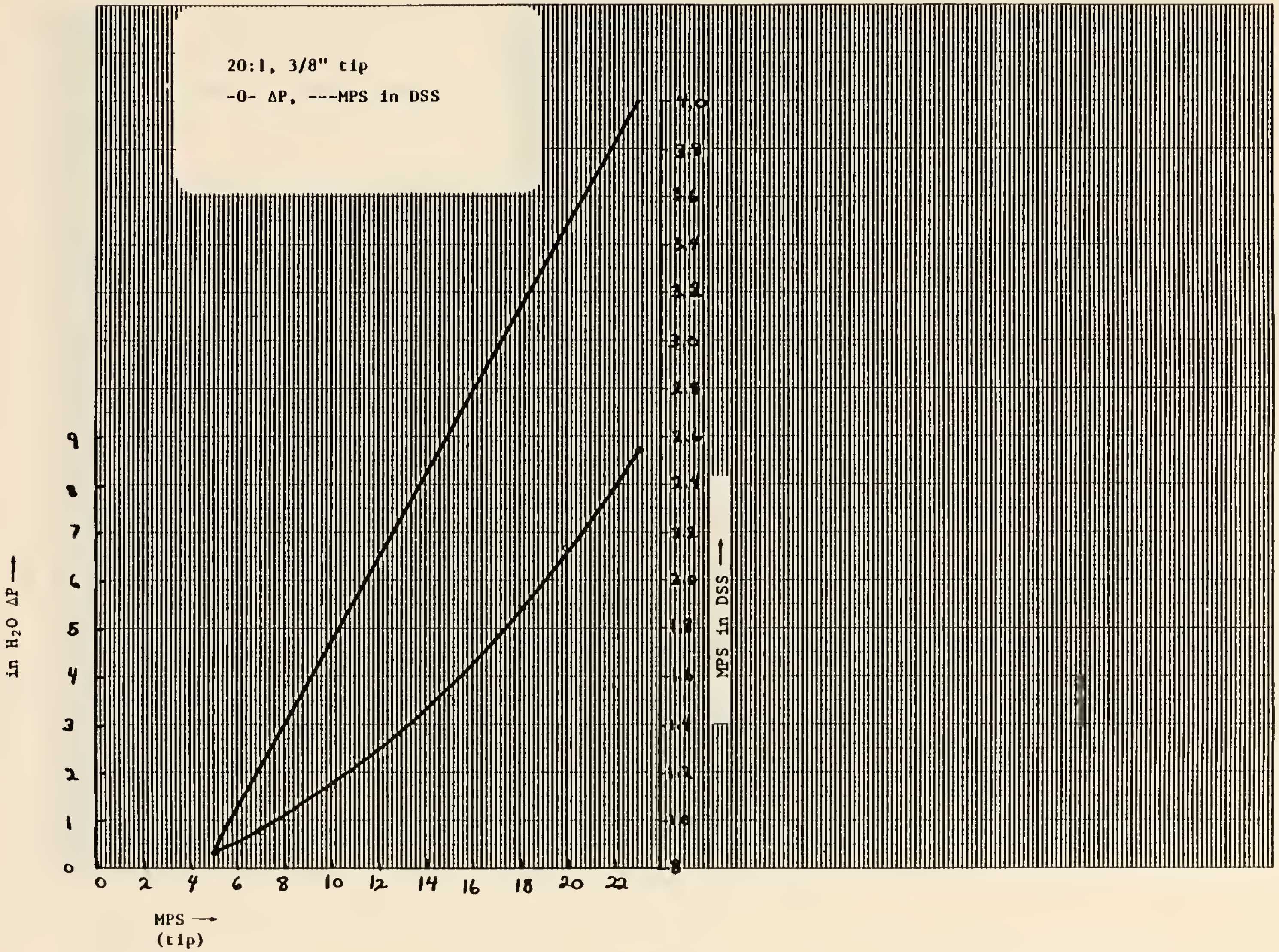
Calibration Chart 3



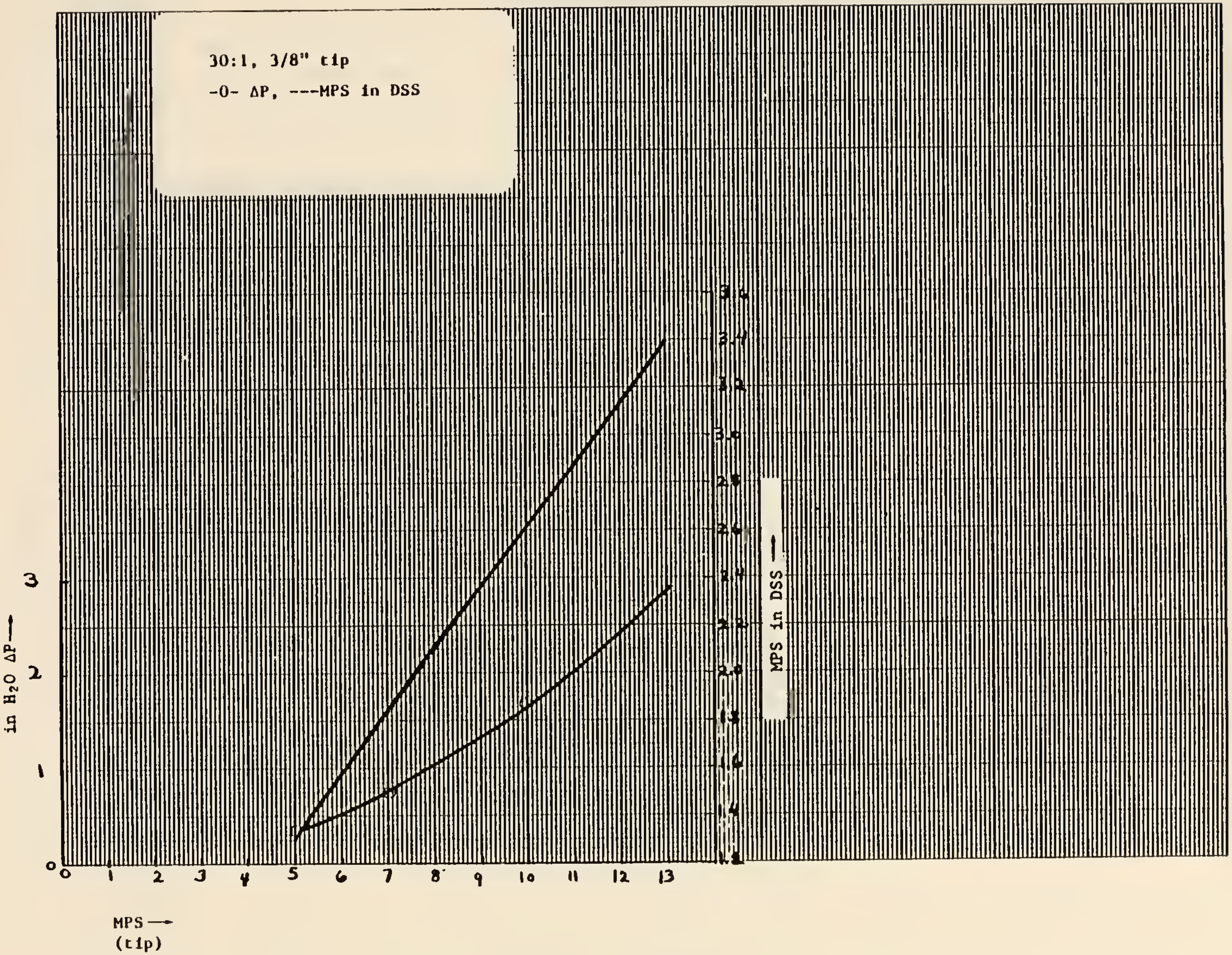
Calibration Chart 4



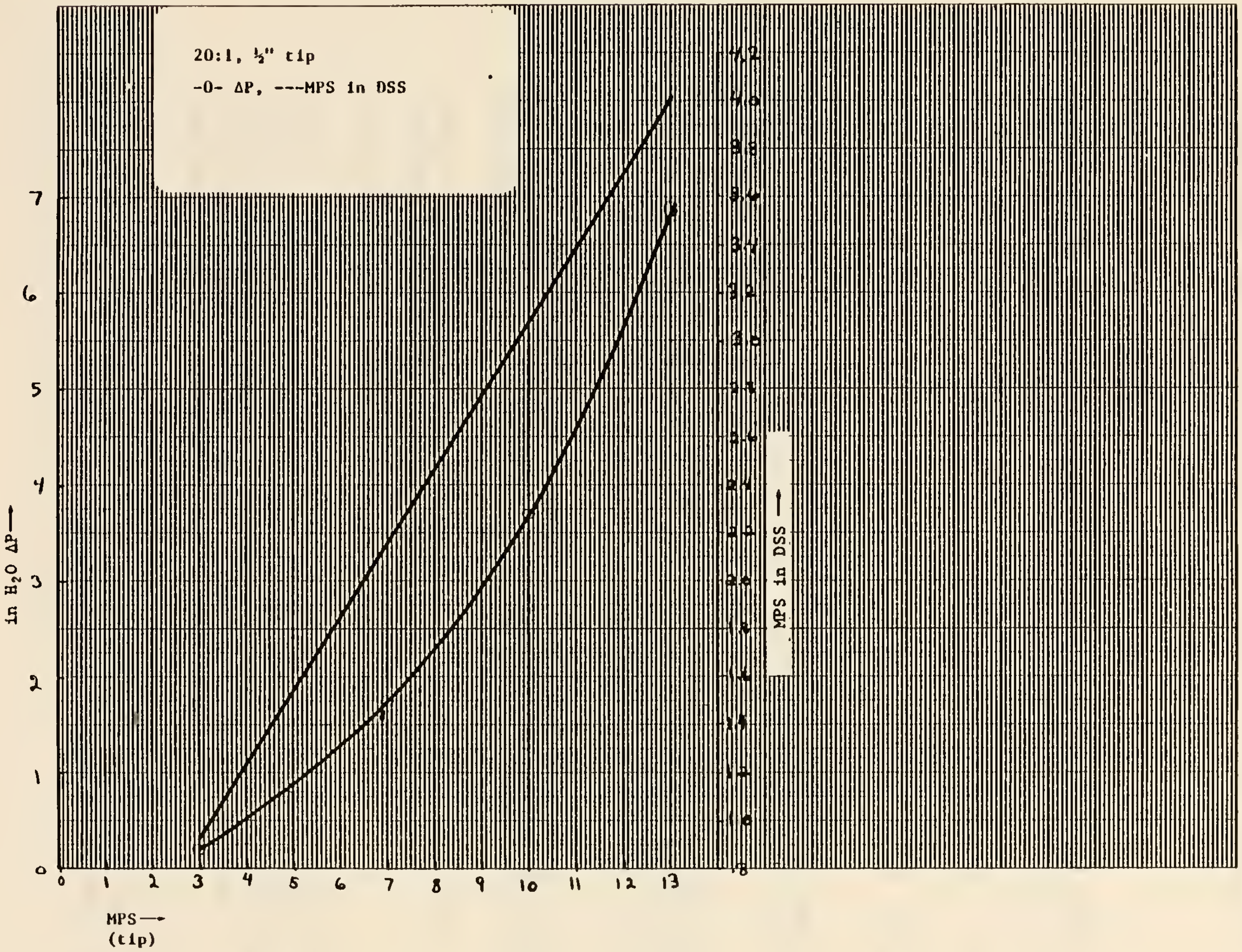
Calibration Chart 5



Calibration Chart 6



Calibration Chart 7



Calibration Chart 8

D. Install correct sampling nozzle as determined from step C and install a dichotomous inlet pipe to provide internal isokinetic conditions. Record nozzle and inlet pipe diameters chosen.

E. Assemble pre-cleaned dilution sampling chamber.

F. Connect total stack pressure sensor to probe.

G. Insert probe and pressure sensor into stack a measured distance from the stack wall. Record distance and identify port (e.g., south port).

H. Plug in probe, connecting hose and inlet pipe heating tapes. Allow a minimum of 15 minutes warm-up time prior to sampling.

I. Install a clean glass fiber filter into the inlet 8" X 10" filter housing.

J. Install 37 mm filters into dichotomous sampler units. Record filter numbers. Return numbered petri dish containers to filter field transport box.

K. Simultaneously adjust the pressure drop between the dilution chamber and the stack and the total gas flow within the dilution chamber to the values determined in step C with variable transformers connected to an inlet blower and an outlet (vacuum) blower.

L. Turn-on dichotomous samplers. Adjust the total flow to 16.7 lpm and the coarse flow to 1.67 lpm using previously calibrated rotometers. Note start time on dichotomous sampler timers.

M. Readjust the pressure drop and dilution chamber gas flow after dichotomous samplers are running.

N. Disconnect thermal anemometer and install plug.

O. After 15 minutes of sampling time, measure the ambient temperature, dilution chamber temperature and re-measure stack temperature. Record temperature data. Re-install thermal anemometer and adjust the pressure drop and the dilution chamber flow if necessary. Disconnect thermal anemometer and install plug.

P. Estimate sampling duration from previous data on stack particulate loading, the experimental sampling dilution ratio and the mass of particles which is desired to be collected. The desired mass for Teflon filters is between 0.5 and 3 mg.

Q. Visually inspect dichotomous filters intermittently to estimate the amount of mass collected and to estimate the length of time which sampling shall continue. Also readjust flow rates if necessary at these intermittant inspections.

R. When sufficient sample is collected, measure and record the pressure drop between the dilution chamber and stack, the velocity in the dilution chamber and the dichotomous sampler rotometer readings. Then turn off dichotomous samplers and immediately replace loaded filters into their original labeled petri dish containers. Record dichotomous sampler timer readings. Measure and record ambient, in-stack and dilution chamber temperatures. Record stop time.

Standard Operating Procedure

Fugitive Process Sampling

1. General Discussion

A. Constant Emission Sources

Process fugitive emissions are defined for the purposes of sampling collection techniques as those emissions which are produced by active industrial processes in contrast to passive fugitive emissions which are produced by wind or non-related vehicular traffic. There is generally enough localization to most process fugitive emission sources so that their particles can be sampled near their point of entry into the atmosphere. Roof vents, duct exhausts, material handling areas or enclosures, milling and grinding operations, open burning, etc. are examples of constant process fugitive sources.

The most appropriate technique for the sampling of constant process fugitive sources is to simply utilize a dichotomous sampler and a lo-vol TSP sampler. Fugitive source samples are collected in an analogous fashion as ambient samples with several exceptions. The positioning of the dichotomous head and lo-vol filter cassette must, in some cases, be accomplished by custom-made brackets or extension tubes to hold them in the plume or path of the source particles, e.g., extended from a walkway railing near a roof vent. The control units for the dichotomous and lo-vol TSP samplers are connected to the sample collection heads by extra lengths of intake tubing. Frequently in-plant power is not standard 110 volt and hence 220 and 440 volt transformers may be required to operate the sampler control units.

A major difference which is encountered between ambient sampling with dichotomous and lo-vol TSP samplers and sampling fugitive emission is the heavier particulate concentrations near the emission sources. To achieve optimal filter loading (0.53 mg for XRF and NAA analyses on teflon filters) a shorter sampling duration is required.

B. Intermittent Emission Sources

Some important process fugitive emissions are episodic and of short duration, e.g., slag pouring, dynamite explosions, furnace upsets, etc. To collect an adequate sample for analyses usually a number of emission episodes are collected onto a single filter by turning the sampler on at the beginning of an emission period and turning it off again immediately thereafter. Due to the absence of available AC outlets often encountered at locations where intermittent emission sampling is required, a portable generator may be necessary.

2. Materials and Supplies

A. NEA low-volume TSP sampler

B. Sierra Dichotomous sampler

C. Sample transport boxes

D. Preloaded 37 mm filters in filter cassettes and plastic petri dishes

E. Preloaded 47 mm filters in quick disconnect holders

F. Custom brackets or sampler stands

G. Transformers or generator, if needed

H. Heavy duty extension cords

I. Extra lengths of low-volume and dichotomous sampler vacuum tubing

3. Sample Collection

A. After a site has been chosen for sampler set-up, a narrative description and a photograph of the sampler's location should be made. Sampling duration and on and off time(s) should be noted as well as any observations concerning such parameters as plant operations, emission character and intensity, raw materials, process conditions, etc. Samplers should be positioned in such a fashion as to minimize the impact of background or other sources and to maximize the impact from the process source of interest.

B. The same operating procedures and filter handling, shipping and storage protocols are employed with the collection of process fugitive emissions with low-volume and dichotomous samplers as are used with the collection of ambient samples and the reader is referred to the ambient standard operating procedures.

Due to the high and generally unpredictable aerosol concentrations, frequent checks of filter loading are necessary to insure that the optimum amount of mass is collected onto the filter. Generally, the process fugitive sampling duration is shorter than that which is required for ambient sample collection, due to higher aerosol concentration.

Appendix B

Dilution Sampling For Chemical Receptor Source Fingerprinting - APCA Paper # 82-61M.2

82-61M.2

Dilution Sampling for Chemical Receptor Source Fingerprinting

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For Presentation at the 75th Annual Meeting of the
Air Pollution Control Association
New Orleans, Louisiana June 20-25, 1982

Introduction

The chemical mass balance receptor method of source apportionment requires that the chemical composition of both ambient aerosols and particles from all major sources in a given airshed be measured for state-of-the-art results.[1] Generally, the limiting factor in chemical mass balance (CMB) studies is the size-resolved chemical characterization of the source particles, particularly stack aerosols. Literature values are available for some stack types, but due to the purpose or manner in which the samples were collected, the chemical fingerprints obtained frequently are not detailed enough for CMB source apportionment work. Often, literature tabulations of elemental data are incomplete or the elemental concentrations have been grouped together (e.g., total alkali metals). Most stack data have been obtained from baghouse dust, in-stack samplers or from EPA Method 5-type equipment. Samples collected in such a manner are not representative of the size distribution nor of the chemical composition of stack particles after they mix and cool in the atmosphere. Condensation, vaporization, agglomeration and secondary chemical reactions can significantly alter the size distribution and chemical composition of stack aerosols when ambient dilution and cooling occur.

The desire to obtain samples of particulate material in the form which it will have after it has been emitted into the atmosphere has stimulated the development of dilution/cooling systems.[2-6] The fundamental principles inherent in the design of a dilution/cooling system are: (1.) the isokinetic withdrawal of an aerosol stream from an industrial stack source, (2.) the mixing and cooling of the source aerosol with excess filtered ambient air and (3.) collection of size categorized particulate samples from the dilution chamber in a form compatible with standard methods of particulate analysis. The requirements of dilution sampling, the design of a pragmatic dilution/cooling system and data obtained with the system from several industrial stacks are presented here.

Requirements of Receptor-Oriented Dilution Sampling

The principal objective of receptor-oriented dilution sampling is to obtain chemical data representative of particulate emissions entering the environment from a point source. Unlike more traditional source sampling, in-stack gravimetric emission rates are of only secondary importance. This fundamental difference in objective requires modification of criteria which are typically considered most important for obtaining "good" stack test data. An adjustable dilution ratio, isokinetic flows, the maintenance of analytically clean sampling conditions, equipment portability, the ability to integrate emission variability and the collection of size-classified particles onto ambient filter media are the primary features which have been incorporated into the design of the dilution sampling system described here.

The dilution air/stack gas ratio must be adjusted for the general application of a dilution cooling system since characteristic temperatures, flow rates, particulate concentrations and water vapor content vary dramatically with stack type. Two opposing factors must be taken into consideration when selecting a dilution air/stack gas ratio. Enough dilution air is

required to achieve the primary objective of reducing the temperature to near ambient and, in addition, to prevent the condensation of water vapor. (Condensed water is deleterious to the collection of particulate samples on a filter medium.) However, the dilution ratio must also be adjusted low enough so that there is a sufficient particulate concentration in the diluted aerosol to collect adequate sample mass for analysis within a reasonable time frame. A workable compromise must be developed for each set of stack parameters.

The accurate control of linear and volumetric flow rates is critical for a dilution sampling system. The dilution ratio, as discussed, must be adjustable. Isokinetic conditions must be maintained at two points in the dilution sampling system. These are at the point of removal of the stack aerosol with a probe and at the point of removal of an aliquot of the diluted gas stream from the dilution chamber for size classification and sample collection. The size-classifying equipment (e.g., a dichotomous sampler or a cyclone) also requires a specific flow rate to maintain the correct size distribution. Finally, the ability to slow the overall sample collection rate is valuable if longer sampling times are needed to integrate the variability from stacks with non-uniform emission characteristics.

Dilution sampling to adequately reproduce atmospheric mixing requires a relatively large mixing volume and sample residence time. Unfortunately, spatial restrictions imposed by the approach structures to sampling stations as well as sampling platforms themselves often preclude the utilization of large equipment. Similarly, weight is critical as equipment must frequently be hand-carried up vertical ladders and stairways as well as through areas which are physically difficult to negotiate. To satisfy these requirements, a pragmatic dilution sampling system must be constructed in such a manner as to facilitate its disassembly and reassembly and be constructed with lightweight materials where possible.

To obtain detailed chemical fingerprints, including trace elements, from a variety of chemically dissimilar stacks in industrial surroundings, precautions must be taken to avoid external contamination and to insure analytically clean sampling conditions within the dilution system. Disassembly and laboratory cleaning between stack tests to prevent cross contamination are essential. Emissions from stacks are often caustic or corrosive in nature, hence materials used in the construction of a dilution sampler should not structurally degrade or leach with exposure or produce chemical artifacts. In addition, because sampling is often conducted in an area of high ambient particulate concentration and because of the high ambient air/stack gas ratio, it is also important that the dilution air be well filtered before entering the dilution chamber.

To parallel the size distribution typically obtained from ambient sampling equipment, the sample removed from the dilution chamber can be size categorized with either a dichotomous sampler or with a scalping cyclone followed by a back-up filter. In both cases, standard teflon membrane filters such as are used in the collection of ambient samples for inorganic analysis can be employed due to the low temperatures produced by dilution. If carbon or organic analyses are desired, glass fiber filters can be equally well used.

Uniform loading of between 0.5 and 3 mg of material on a teflon membrane filter is optimum for combined thin film x-ray fluorescence spectrometry and neutron activation analysis which are routine techniques for ambient filter analysis. Because these techniques are non-destructive, other analytical methods often used for the analysis of ambient aerosol filters, such as ion chromatography, atomic absorption spectrophotometry or microscopy, can also also be utilized.

The collection of samples in a form which permits the use of standard methods of air particulate analysis is advantageous for several reasons. New and untested preparatory and analytical protocals need not be developed for source samples if routine ambient aerosol techniques are applicable. Determinate errors often encountered when comparing data generated by different analytical techniques will be avoided when statistically comparing source and ambient (receptor) data during CMB calculations. Most importantly, both the source and ambient matrices contain the same set of quantified elements with similar associated uncertainties and detection limits for the same size categories of particles. The ability to form a detailed and uniform data set for both source and ambient particles is a key factor in conducting a state-of-the-art source apportionment study by CMB modelling.

The Dilution Sampling System

Figure 1 illustrates the dilution sampling system which has been developed for the chemical characterization of stack aerosols. The system can be divided into three principal parts: (1.) the sampling probe, (2.) the dilution chamber, and (3.) a particulate collector. The sampling probe and flexible hose connecting the probe with the dilution chamber can be heated to minimize wall condensation. The probe is constructed of stainless steel and the connecting hose is lined with teflon. Any standard sized buttonhook nozzle can be attached to the probe to permit a number of volumetric flow rates to be obtained at a given isokinetic linear flow velocity.

The dilution chamber is constructed of 10.2 cm (4 in.) polyvinyl chloride (PVC) pipe which has been fitted with several threaded unions to permit its disassembly for transport and cleaning. Because of its small "broken-down" size and light weight, the sampler can be sent as excess baggage on commercial airlines and hand carried or hand winched to stack sampling platforms. A turbulent mixing rather than a linear buoyant plume approach was taken because the ninety degree bends in the system permit it to be relatively compact while still maintaining a long dilution path length (approximately 3 meters). Turbulent conditions also maximize the mixing which occurs during the relatively short particle residence time within the dilution chamber (typically about 1-3 seconds). A high volume vacuum motor and blower independently controlled by variable transformers provide the vacuum necessary to withdraw the stack gas sample and provide the dilution air. The dilution air is filtered through a standard 20 cm X 25 cm (8 in. X 10 in.) glass fiber filter held in an in-line filter holder

Stack ambient and dilution chamber temperatures are measured with simple bimetal thermometers. Stack gas velocity is measured with a pitot tube. The velocity of gas within the dilution chamber is measured with a thermal anemometer. The difference in pressure between the dilution chamber and the stack must be measured and is accomplished with a Magnehelic gauge (trade name Dwyer Instruments, Inc.).

An aliquot of the gas flow within the dilution chamber is isokinetically withdrawn for size classification and particle collection by a stainless steel tube centered within the 10.2 cm PVC dilution chamber and aligned parallel with the gas flow. A virtual impactor was used for size classification and particle collection in the configuration illustrated in Figure 1. A scalping cyclone followed by a back-up filter has also been used with the dilution system. Cyclone particle cut points (D_{50}) of 15μ, 10μ, or 2.5μ would all be appropriate for use with receptor modelling depending on the specific requirements of the study.

The transfer of particulate bearing stack gases via the heated probe to the dilution chamber is accomplished by maintaining a pressure differential between the dilution chamber and the interior of the stack. From Bernoulli's equation of continuity it can be shown that the linear velocity of gas entering the buttonhook nozzle is dependent only on the pressure drop and density of the stack gas, i.e.,

$$V = \sqrt{\frac{\Delta P}{.5\ \rho}} \qquad (1)$$

Bernoulli's equation is only strictly applicable to idealized fluids but is illustrative for design considerations. A plot of actual flows measured in the laboratory with a mass flow meter versus those predicted by the pressure drop and Bernoulli's equation demonstrated the predictive capability of equation 1. A linear relationship (slope = .44, R = .98) was obtained between predicted nozzle velocity (abscissa) and measured nozzle velocity (ordinate) for measured velocities up to 40 meters/sec. Since the buttonhook sampling nozzle collects gas parallel with the direction of flow, the pressure value used to calculate ΔP in equation 1 must take into account the effect of velocity pressure, i.e.,

$$\Delta P = \left[P_{s,s} + \tfrac{1}{2}\,\rho_s V_s^2\right] - P_{d,s} \quad , \qquad (2)$$

where, $P_{s,s}$ is the static pressure within the stack,

ρ_s is the density of gas within the stack,

V_s is the linear velocity of gas within the stack, and,

$P_{d,s}$ is the static pressure within the dilution chamber.

Measurement of ΔP can be accomplished by the use of two commercially available sensor tips (one for static pressure and one for total pressure) connected to a Magnehelic gauge.

The reduced pressure and flow within the dilution chamber is produced by a high volume vacuum pump. If the blower is not used, each flow rate has a corresponding pressure drop associated with it. The vacuum pump flow rate can be regulated by controlling the pump motor with a variable transformer. Unfortunately, the pressure produced at high flow rates (high dilution ratios) is too high with the vacuum motor alone operating to permit isokinetic sampling (see equation 1). The addition of a high volume blower reduces the pressure drop and permits any combination of dilution chamber pressure and flow rate. For example, if a high dilution flow rate (i.e., high dilution ratio) and a low pressure drop (low linear velocity in sampling tip) is desired, the high volume vacuum pump is operated at near maximum power and the blower is adjusted until the pressure drop is lowered to the point where isokinetic sample velocities are obtained in the sampling tip. It should be noted that changing buttonhook nozzles ranging in size from 3.2 mm (1/8") to 12.7 mm (1/2") in diameter has a relatively small effect on dilution chamber pressure and hence the change in linear velocity with tip diameter is small. Volumetric flow and the subsequent dilution ratio will, however, change in proportion to the square of the nozzle radius.

Near the exhaust of the dilution chamber an aliquot of the diluted flow is transferred isokinetically into a dichotomous sampler or a scalping cyclone with a back-up filter for particulate collection. Particles have been collected on standard 37 mm or 47 mm filters and treated thereafter with the same protocol as ambient samples. Because the flow rate necessary to maintain the correct particle size cut point is fixed for both dichotomous samplers and cyclones, near isokinetic inlet velocities are obtained with a set of interchangeable stainless steel pipes of varying diameter. For example, if a dichotomous sampler is employed (correct flow 16.7 l/min.) and the desired dilution ratio dictates a flow of 1.7 M^3/min. inside the 10.2 cm diameter dilution chamber, an inlet pipe with an internal diameter of 11.2 mm would produce isokinetic conditions (2.9 M/sec.). Similarly a dilution chamber flow of 0.85 M^3/min. would require a dichotomous inlet pipe with a diameter of 14.2 mm to maintain isokinetic velocity (1.7 M/sec.).

The use of a dichotomous sampler without the aerosol inlet cap (D_{50} of 15µ) produces two size categories (< 2.5µ and > 2.5µ). The chemical composition of the greater than 2.5µ size fraction has been assumed to be approximately equivalent to the chemical composition of particles in the normal coarse size fraction (2.5–15µ) collected by a dichotomous sampler. The particle penetration efficiency through the dilution sampler decreases with size and it is unlikely that many particles greater than approximately 20µ reach the > 2.5µ filter. In addition, the bulk of most stack particles (especially those stacks with properly operating control equipment) have an aerodynamic diameter less than 15µ and chemical fractionation with size is less dramatic for larger particles.

Only three in situ measurements are required to operate the dilution sampler in the field once laboratory calibration of flow rate versus pressure drop has been performed. These are: (1.) stack gas velocity, (2.) the difference in internal pressure between the stack and the dilution chamber (equation 2) and, (3.) the velocity of air passing through the dilution chamber from which the dilution ratio can be determined. The stack, ambient

and dilution chamber temperatures are useful but not necessary. In addition, knowledge of the typical water vapor content contained in the stack emissions and the relative humidity of the ambient air are also useful so that enough dilution air is used to avoid water condensation. A dilution air/stack gas ratio of 20/1 has been found sufficient to avoid condensation in most cases.[2] If, however, the dilution air has a high relative humidity or the stack has a very high water vapor content, e.g., a lime kiln with a 50% water vapor content, a higher dilution ratio would be necessary. Generally stack data from previous tests are available so that approximate isokinetic velocity requirements can be anticipated and an appropriate dilution ratio can be selected prior to sample collection. Other factors such as the emission variability characteristic of the stack and typical particulate mass concentrations (grain/DSCF) are also useful in planning stack tests. Enough flexibility has been built into the sampling system to accommodate nearly all combinations of pressure, flow rate, temperature, water vapor content and mass concentration encountered in stack environments. Table I lists some typical stack parameters and the corresponding time required to collect a particulate sample for analysis. The sampling time estimates are based on the use of a 9.5 mm (3/8") I.D. sampling nozzle, a 20/1 dilution ratio and the collection of 3 mg of of particulate material with an interfaced dichotomous sampler.

Stack Tests and Analytical Procedures

The chemical composition of size categorized particles emitted from power boiler stacks, primary lead smelting stacks and a zinc fuming stack was determined from samples collected with the dilution sampling system. The power boiler samples were collected consecutively with two cyclone/back-up filter assemblies with cut-points at 2.5μ and 15μ used one after the other. The lead smelting and zinc fuming stack samples were collected by a dichotomous sampler with the 15μ aerosol inlet removed. The size categories thus obtained were: (1.) < 2.5μ for both the power boiler and lead smelting/zinc fuming stacks, (2.) < 15μ for the power boiler stacks and, (3.) > 2.5μ for the lead smelting/zinc fuming stacks. Teflon membrane filters were used to collect all samples. The mass of particles collected on each filter was measured with a Cahn Instruments Electrobalance. Thin film energy dispersive x-ray fluorescence spectrometry and instrumental neutron activation analysis were the analytical techniques used to determine the elemental concentrations.

The thin film x-ray fluorescence analyses were conducted with an Ortec TEFA III analyzer equipped with a Mo/W x-ray tube. Three excitation conditions were used: (1.) Mo tube, 50 KV tube voltage, Mo filter, (2.) Mo tube, 15 KV tube voltage, no filter and (3.) W tube, 35 KV tube voltage, Cu filter. A tube current of 100 μ amps and an analysis time (live) from 100 to 400 seconds were used in all conditions. Instrument calibration was obtained with commercial standards prepared by Micromatter, Inc. and Columbia Scientific Industries. A quality assurance standard and blank was run with each set of filters.

After the x-ray fluorescence analyses were completed, instrumental neutron activation analyses were performed on the filters. The filters were irradiated at 95% full power in a Triga Mark I 250 KW reactor. The neutron flux was 5×10^{12} neutrons/cm^2-sec. Copper flux monitors were used. Standards included

an NBS urban particulate reference material (SRM #1648), an IAEA soil standard (#5), a USGS basalt sample (BCR-1) and an Atlantic Richfield Hanford Company basalt sample (ARHCO-1). The samples were counted with an Ortec HPGe detector interfaced with a Norland IT-5400 multichannel analyzer. Both the power boiler samples and the lead smelting/zinc fuming samples were irradiated for 5 minutes, cooled for 10 minutes, and then counted for 200 seconds (live) time. The lead smelting/zinc fuming samples were then irradiated for an additional 8 hours and counted for 20 minutes after a 3 day cooling period and counted again for 1 hour after a total cooling period of 30 days.

Results and Discussion

Representative source fingerprints obtained from samples collected with the dilution sampling system are presented in Tables II and III. All concentration data are reported in weight percent along with analytical uncertainties. The concentrations of 22 elements have been reported for the power boiler stack particles and the concentrations of 28 elements have been reported for the lead smelting/zinc fuming stack particles. The concentration of approximately five additional elements were measured but are not listed in Tables II or III.

A multi-element source fingerprint which includes both the concentration or "less-than" values for trace elements as well as containing accurate concentration values for major elements is required for chemical mass balance modelling. A low concentration of a particular element in source particles is nearly as important as its presence at high concentration. For example, the contribution of a hog fuel boiler to ambient aerosol concentrations was easily distinguished from the contribution of a nearby residual oil fired boiler by CMB modelling since accurate elemental concentration data was produced. While the concentrations of all elements are used in the multi-component least squares approach, the differences in K, V and Ni concentrations between the two sources can illustrate this point. The hog fuel boiler has a very high K content and a very low V or Ni content in contrast to the residual oil fired boiler which emits particles containing V and Ni at the percent level and virtually no K. Similarly, the ambient contribution from the sinter stack, the zinc fuming stack and the blast furnace stack were distinguished from each other in a CMB airshed study due to the differences in their elemental fingerprints. Again, while the concentration of all elements is essential, the ratio of three elements (Cd, Zn and Fe) can illustrate the ability to distinguish stack particles based on differences in their elemental compositions. The Cd:Zn:Fe ratios are 0.2:0.7:1, 0.5:337:1 and 185:115:1 for the < 2.5u size fraction of the particles emitted from the sinter stack, the zinc fuming stack and the blast furnace stack, respectively.

In addition to stack particles, the chemical composition of particles originating from all other major airshed sources (viz. fugitive sources) need to be characterized for a state-of-the-art CMB source apportionment study. While the differences in particles originating from two or three discrete sources, such as the stacks discussed here, can be qualitatively observed by

comparing concentration levels of several elements. It should be emphasized that complete and detailed fingerprints such as presented in Tables II and III are necessary to quantitatively identify the contribution of a given source among the multiplicity of particulate sources that are potential contributors to ambient aerosol concentrations. Besides accurate analytical measurements, the collection of particles with the dilution sampler in a form similar to that which they acquire after mixing and cooling with ambient air furthers the accuracy of the chemical fingerprint used to represent particles originating from them. The impact of both the power boiler stacks and lead smelting/zinc fuming stacks were determined in airsheds even when their contribution was minor as compared to the contribution from other (mainly fugitive) sources due to the detailed and representative source fingerprints obtained with the dilution sampler.

Conclusions

A pragmatic dilution sampling system for the collection of stack particles for use in receptor oriented chemical mass balance source apportionment studies has been developed. The system permits the accurate characterization of over thirty elements as well as other chemical species. The system is easily transportable, is relatively simple to operate and can collect particles in size categories which are compatible with existing and proposed ambient particulate categories (i.e., < 2.5u, 2.5-15u, 10u, < 15u and TSP). The system has been used to collect samples from a number of stacks in two airsheds where CMB source apportionment modelling was subsequently conducted with the data. In addition to CMB modelling of local airsheds, the dilution sampling system would be applicable to the collection of condensible organic compounds such as might be analyzed by gas chromatography/mass spectroscopy and would be useful for the collection of source samples used to model the long range transport of particles associated with the acid rain controversy.

NOTE TO EDITORS

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TABLE I - TYPICAL STACK PARAMETERS AND CALCULATED SAMPLING TIMES

Stack	Linear Flow Velocity (m/sec)	Particulate Loading (grain/DSCF)*	In-Stack Temperature (°C)	Sampling Time (min)
Hog fuel boiler	7.5	.07	69	41
Kraft recovery boiler	18.5	.02	129	120
Lead sinter stack	17.4	.06	81	35
Zinc fuming stack	12.0	.01	102	222
Residential wood stove	1.5	.2	300	17

* grain/ft^3 = 2.29 grams/m^3

TABLE II - THE ELEMENTAL COMPOSITION OF POWER BOILER PARTICULATE EMISSIONS

ELEMENT*	Hog Fuel Boiler		Residual Oil-Fired Boiler	
	<2.5u	<15u	<2.5u	<15u
Na	2.7 ± .2	3.1 ± .2	1.08 ± .07	4.2 ± .3
Mg	< .08	0.4 ± .1	< .07	< .1
Al	0.06 ± .01	0.24 ± .02	0.58 ± .03	0.90 ± .05
Si	0.83 ± .04	2.1 ± .1	0.77 ± .04	1.38 ± .07
S	5.5 ± .3	8.9 ± .5	9.4 ± .5	9.6 ± .5
Cl	2.8 ± .1	5.1 ± .3	< .005	.02 ± .01
K	20 ± 1	24 ± 1	0.061 ± .003	0.123 ± .008
Ca	3.0 ± .2	9.8 ± .5	0.58 ± .03	0.65 ± .03
Ti	0.041 ± .003	0.131 ± .008	0.043 ± .003	0.113 ± .007
V	0.011 ± .002	0.023 ± .003	1.88 ± .09	3.6 ± .2
Cr	0.013 ± .002	0.014 ± .002	0.021 ± .002	0.037 ± .006
Mn	0.19 ± .01	0.39 ± .02	0.028 ± .002	0.068 ± .004
Fe	0.19 ± .01	0.6 ± .2	1.20 ± .06	3.6 ± .2
Ni	0.005 ± .001	0.007 ± .002	3.3 ± .2	7.8 ± .4
Cu	0.068 ± .004	0.087 ± .006	0.010 ± .002	0.016 ± .007
Zn	0.75 ± .04	1.31 ± .07	0.109 ± .006	0.155 ± .008
As	0.036 ± .006	0.08 ± .01	0.003 ± .002	0.018 ± .006
Se	0.003 ± .001	0.006 ± .001	0.014 ± .009	0.022 ± .002
Br	0.015 ± .001	0.029 ± .002	0.0018 ± .0004	0.004 ± .001
Cd	0.05 ± .01	0.10 ± .02	< .004	< .02
Ba	0.10 ± .06	0.3 ± .1	< .03	< .1
Pb	0.127 ± .008	0.44 ± .02	0.062 ± .004	0.17 ± .01

*All values are in weight percent.

TABLE III - THE ELEMENTAL COMPOSITION OF LEAD SMELTING AND ZINC FUMING EMISSIONS

ELEMENT	SINTER STACK		ZINC FUMING STACK		BLAST FURNACE STACK	
	<2.5μ	>2.5μ	<2.5μ	>2.5μ	<2.5μ	>2.5μ
Al	0.9 ± .2	1.0 ± .3	0.5 ± .1	0.3 ± .1	< .3	< .2
Si	3 ± 1	4 ± 1	1.5 ± .3	0.2 ± .2	< .4	< .4
P	0.80 ± .08	0.8 ± .1	0.16 ± .02	0.18 ± .02	0.76 ± .08	0.23 ± .07
S	16 ± 2	15 ± 3	3.6 ± .3	3.3 ± .4	13 ± 1	13 ± 2
Cl	3.0 ± .5	0.9 ± .2	1.2 ± .4	0.3 ± .1	5.0 ± .8	4.2 ± .5
K	0.89 ± .09	0.2 ± .1	0.56 ± .06	0.61 ± .06	2.1 ± .2	2.2 ± .2
Ca	2.6 ± .3	5 ± 1	0.2 ± .1	0.3 ± .1	0.56 ± .06	0.54 ± .07
Ti	0.12 ± .02	0.20 ± .03	0.026 ± .003	0.013 ± .003	0.022 ± .003	0.018 ± .007
V	0.004 ± .001	0.010 ± .003	< .0001	< .0001	< .003	< .005
Cr	0.046 ± .005	0.06 ± .01	0.011 ± .001	0.014 ± .002	0.020 ± .002	0.011 ± .006
Mn	0.38 ± .08	0.5 ± .1	0.002 ± .001	0.010 ± .005	0.007 ± .001	0.008 ± .001
Fe	5.8 ± .6	8 ± 1	0.16 ± .02	0.38 ± .04	0.13 ± .01	0.16 ± .03
Ni	0.082 ± .008	0.09 ± .02	0.10 ± .01	0.11 ± .01	0.060 ± .006	0.055 ± .008
Cu	1.5 ± .1	3.1 ± .3	0.31 ± .02	0.37 ± .03	0.35 ± .04	0.36 ± .04
Zn	4.3 ± .4	5.2 ± .8	54 ± 5	59 ± 6	15 ± 2	15 ± 1
As	4.9 ± .5	2.9 ± .4	1.4 ± .1	1.5 ± .2	3.0 ± .3	3.3 ± .3
Se	0.13 ± .01	0.08 ± .02	0.011 ± .002	0.012 ± .003	0.032 ± .008	0.018 ± .01
Br	0.08 ± .03	0.06 ± .01	0.006 ± .002	0.005 ± .001	0.13 ± .03	0.12 ± .07
Sr	0.30 ± .03	0.26 ± .04	0.006 ± .002	0.009 ± .004	0.010 ± .002	< .03
Pd	0.03 ± .02	< .06	0.13 ± .01	0.06 ± .01	0.20 ± .02	.035 ± .024
Ag	0.35 ± .03	0.33 ± .07	0.048 ± .006	0.04 ± .01	0.16 ± .02	0.15 ± .04
Cd	1.4 ± .1	1.1 ± .2	0.08 ± .01	0.06 ± .02	24 ± 3	21 ± 2
In	0.015 ± .003	0.015 ± .002	0.056 ± .008	0.03 ± .01	0.015 ± .003	0.05 ± .01
Sn	0.33 ± .05	0.12 ± .11	0.70 ± .02	0.71 ± .07	0.50 ± .05	0.40 ± .08
Sb	1.9 ± .2	1.6 ± .3	0.54 ± .03	0.59 ± .06	0.14 ± .06	< .2
Ba	< .3	< .8	< .04	< .1	0.12 ± .07	< .5
Hg	0.12 ± .02	0.14 ± .03	0.064 ± .006	0.061 ± .009	0.02 ± .01	0.025 ± .020
Pb	22 ± 3	37 ± 4	2.4 ± .2	10 ± 1	31 ± 3	10 ± 3

*All values are in weight percent

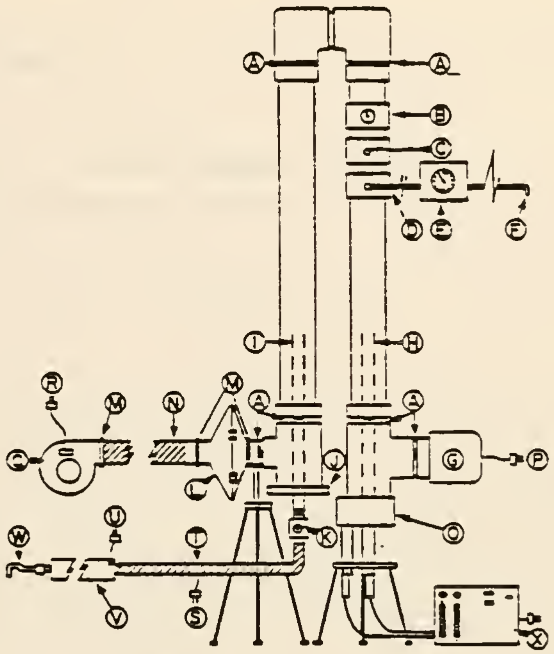

Figure 1. Dilution Source Sampler

(Not drawn to scale.) Height is approximately 2 meters, and unit is constructed with 10.2 cm (4 inch) diameter pipe. Design features include: (A) Threaded connectors for disassembly and transport, (B) thermometer, (C) gas velocity sensor to thermal anemometer, (D) static pressure sensor, (E) Magnehelic gauge, (F) total pressure sensor for in-stack measurements. (G) high volume vacuum motor, (H) interchangeable (0.64 to 2.54 cm I.D.) dichotomous inlet pipe, (I) stack gas inlet pipe, (J) stainless steel and asbestos end assembly, (K) threaded union with thermometer, (L) hinged 20 cm x 25 cm (8 inch x 10 inch) filter holder, (M) quick disconnect fittings, (N) flexible hose, (O) dichotomous sampler head, (P) power cord from high volume vacuum meter to a variable transformer, (Q) high volume blower, (R) power cord to a variable transformer, (S) power cord to heat tape, (T) insulated stainless steel teflon tubing, (U) power cord to heat tape, (V) 1.5 meter stainless steel stack probe, (W) button-hook sampling nozzle, and (X) dichotomous sampler control unit.

Appendix C

An Automated Thermal - Optical Method For The Analysis Of Carbonaceous Aerosol

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An Automated Thermal–Optical Method for the Analysis of Carbonaceous Aerosol

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An instrument employing both thermal and optical measurements has been developed for the analysis of organic and elemental carbonaceous aerosol collected on glass or quartz fiber filters. The technique involves volatilization of organic carbon from the filter under conditions where the elemental carbon remains. The volatilized carbon is oxidized to CO_2, reduced to CH_4, and measured by a flame ionization detector. Elemental carbon is subsequently oxidized to CO_2 and measured. The reflectance of the filter is continuously monitored throughout the analysis by a helium-neon laser system. During the organic analysis some of the organic carbon is pyrolytically converted to elemental carbon; this results in a decrease in the filter reflectance. Correction for the pyrolytic production of elemental carbon is achieved by measuring the amount of elemental carbon oxidation necessary to return the filter reflectance to its initial value. The instrument is completely automated and is under the control of a microprocessor system. It has been evaluated with respect to model compounds, typical source mixtures (e.g., auto exhaust aerosol), and ambient samples.

Although carbon has long been recognized as an important constituent of ambient aerosols, the analysis of carbon in its many molecular forms has presented formidable obstacles. An approach taken by many investigators (1-12) has been to separate aerosol carbon into organic, elemental, and carbonate classes. However, at the present time only carbonate carbon has an unequivocal analytical definition. Speciation between organic and elemental car-

bon is difficult, and, as Grosjean (13) has pointed out, current analytical definitions of elemental carbon are "operational" or method-dependent.

In this paper we report on recent progress achieved in our laboratory with regard to the separate and quantitative measurement of organic and elemental carbon in aerosol samples. Our initial approach (4) was to heat a segment of an aerosol-containing glass or quartz fiber filter to 600°C in a helium atmosphere. Volatilized organic compounds were oxidized to CO_2 in an oxidation oven, reduced to CH_4, and measured by a flame ionization detector (FID). Residual carbon, which was assumed to be elemental carbon, was oxidized to CO_2 by the addition of O_2 to the combustion oven and measured as above. It was discovered, however, that if the filter was removed from the oven after the organic analysis step--but before the addition of O_2, it was noticeably darker than at the beginning of the analysis. This was indicative of the pyrolytic formation of elemental carbon during the organic analysis (5).

Since that discovery a major aspect of our research effort has been to develop a method to account for this unwanted pyrolytic conversion of organic to elemental carbon. This report describes a combined thermal-optical instrument in which the reflectance of the filter sample is continuously monitored during the thermal analysis. Dod et al. (14) have also reported a combustion technique combined with optical transmission.

Experimental

The carbon analyzer consists of three principal parts: the combustion system, the laser reflectance system, and the microprocessor control. The combustion system is shown in Figures 1 and 2. Four filter disks, each 0.25 cm^2 in area, are mounted vertically in a quartz boat which is located in the loading section of the combustion oven. The oven is purged with a 2% O_2-98% He mixture, and the temperature of the heating zone is set to 350°C. The boat is then inserted into the heating zone in which oxidation and volatilization of organic carbon into the flowing O_2-He stream occur. The volatilized organic carbon is transported through the oxidation zone, which is a bed of granular MnO_2 at 950°C. This results in the oxidation of the organic carbon to CO_2 which is subsequently reduced to CH_4 in the Ni/firebrick (450°C) methanator and measured by a flame ionization detector.

The carrier gas is then changed to He, and after purging to remove O_2, the heating zone temperature is raised to 600°C. This produces a further volatilization of organic carbon which is measured as above. The purpose of the two-step organic analysis is to minimize the problem of pyrolytic conversion of organic to elemental carbon. As discussed below, however, it has not been possible to eliminate this completely, and a significant amount of pyrolytic conversion occurs during the 600°C volatilization.

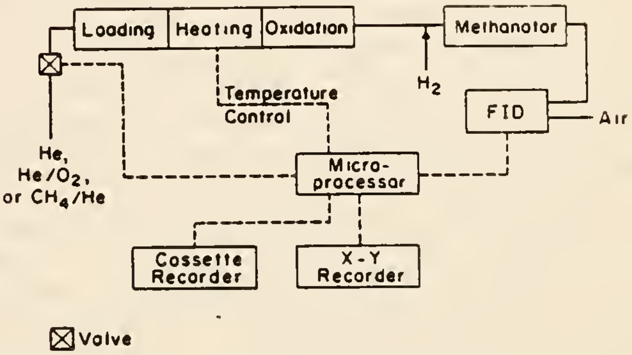

Figure 1. Block diagram of C analyzer. The valve symbol represents a complex network of valves and plumbing.

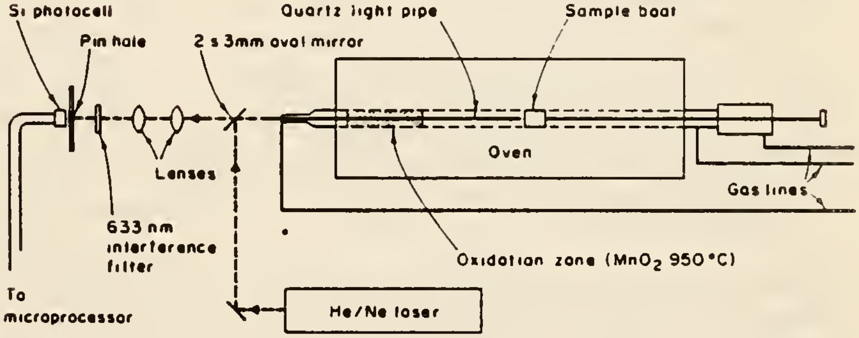

Figure 2. Laser reflectance system. The light pipe is a 3-mm-diameter quartz rod.

The remaining carbon on the filter includes elemental carbon originally on the filter, elemental carbon produced pyrolytically during the organic analysis, and also possibly other forms of carbon which have high temperature stability. This carbon is measured by lowering the heating zone temperature to 400°C and changing the carrier gas to the O_2-He mixture. Oxidation of the carbon to CO_2 is carried out sequentially at 400, 500, and 600°C. This three-step process results in a relatively slow oxidation of elemental carbon and is used in the correction for pyrolytic conversion as described below. When the elemental carbon measurement is complete, the temperature of the heating zone is lowered to 350°C in preparation for the next sample. As the cooling is taking place, a known amount of CH_4 is injected into the oven. The resultant FID response provides a calibration for that run.

The correction for the pyrolytic production of elemental carbon is achieved with the laser reflectance system shown in Figure 2. Light (633 nm) from a He-Ne laser is reflected off the 2x3mm oval mirror and down the quartz light pipe to the filter sample which is mounted vertically with the aerosol deposit facing the light pipe. Much of the returning, diffusely reflected light misses the oval mirror and is collected by the lens system and measured by the photocell. Light which is specularly reflected by the ends of the light pipe is deflected away from the photocell by the oval mirror. Thus the photocell sees primarily light which has been reflected from the filter.

The correction for the pyrolytic production of elemental carbon is accomplished by measuring the amount of elemental carbon oxidation necessary to return the filter reflectance to its initial value. This is facilitated by the three-step elemental carbon oxidation which produces a relatively slow initial rise in the reflectance. A typical output is shown in Figure 3. The pyrolysis correction corresponds to the shaded area which is added to peaks 1 and 2 to give the corrected value for organic carbon. This procedure assumes that the mass absorption coefficient of the pyrolytically produced elemental carbon is the same as that of the original elemental carbon. Research to test this assumption is continuing.

The reflectance system also provides a test of the effectiveness of purging prior to the 600°C/He volatilization of organic carbon. Residual O_2 at 600°C will oxidize elemental carbon and produce an increase in the reflectance of the filter. In the event that such an increase is observed, the sample would be rerun, and if this behaviour persists, the system would be checked for leaks or other malfunctions. Thus, the reflectance system plays an important quality assurance role in the analysis.

The complete analytical system is under the control of a Motorola 6802 microprocessor. All switching of gas flows, timing, temperature control, error detection, analog to digital conversion, FID current measurement, signal integration and manipulation, and data storage and transfer are controlled by this system.

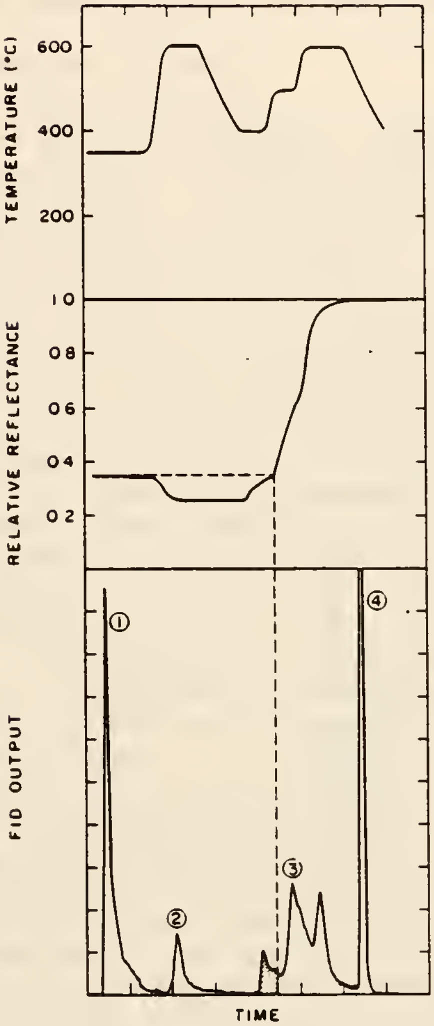

Figure 3. Analytical response. Peaks 1, 2, and the shaded portion of 3 correspond to organic C; the unshaded portion of Peak 3 is elemental C. The shaded portion of Peak 3 constitutes the correction for pyrolytic conversion of organic to elemental C. Peak 4 is the calibration peak.

A block diagram of the microcomputer system is shown in Figure 4. Details of this system are discussed by Johnson (15).

Carbonate carbon is determined on a separate filter segment by measurement of the CO_2 evolved upon acidification with 20 μl of 1% H_3PO_4. Because carbonates also respond in the organic mode during thermal analysis, the organic carbon concentration must be corrected by subtracting the carbonate carbon concentration.

Instrument Validation

Both the accuracy and precision of analysis were investigated by a number of experiments. Known amounts of pure compounds were added to quartz fiber filter segments which were analyzed in the usual manner. The compounds included tetracosane, tetratriacontane, coronene, perylene, glutaric acid, oleic acid, stearic acid, dioctylphthalate, and mannitol. The average percent recovery was 99±6%, and only mannitol, a sugar, showed a significant amount (6%) of conversion of organic to elemental carbon during the organic analysis. Analysis of lampblack gave 1% as organic carbon and 98% as elemental carbon for a total recovery of 99%.

More complex substances, however, showed higher degrees of pyrolytic conversion. In aerosol samples collected from the combustion of distillate and residual oil, 31 and 25% respectively of the organic carbon underwent pyrolytic conversion to elemental carbon. Lesser amounts of conversion were observed for leaded and unleaded auto exhaust samples, and no conversion occurred in a diesel truck exhaust sample. Biological samples also showed large degrees of conversion; e.g., 45% of the carbon associated with wood fiber was pyrolytically converted to elemental carbon.

High degrees of conversion were also observed in ambient samples. In approximately 200 filters from 9 urban sites an average of 22% of the organic carbon was pyrolytically converted to elemental carbon. As a fraction of elemental carbon this corresponded to 23%. Thus, the correction for pyrolytic conversion is significant and cannot be neglected.

To elucidate the nature of the carbon which is pyrolytically converted to elemental carbon, solvent extraction studies were performed. A filter segment was placed in a stainless steel filter holder, and the solvent was forced through the filter by a syringe pump at the rate of 0.5 cm^3/min for 60 minutes. This procedure--rather than more conventional ones (e.g., Soxhlet extraction)-- was used to minimize the wash-off of insoluble particles from the filter. Both extracted and unextracted filter segments were subsequently analyzed in the carbon analyzer. Although the results varied for different solvents and different filters, the principal finding was that up to 80% of the pyrolytic conversion could be eliminated by organic solvent extraction. (Similar removal efficiencies were found for total organic carbon.) These results confirm the organic origin of the pyrolytically produced elemental carbon. Solvent extraction studies to verify the speciation into organic and elemental carbon are continuing.

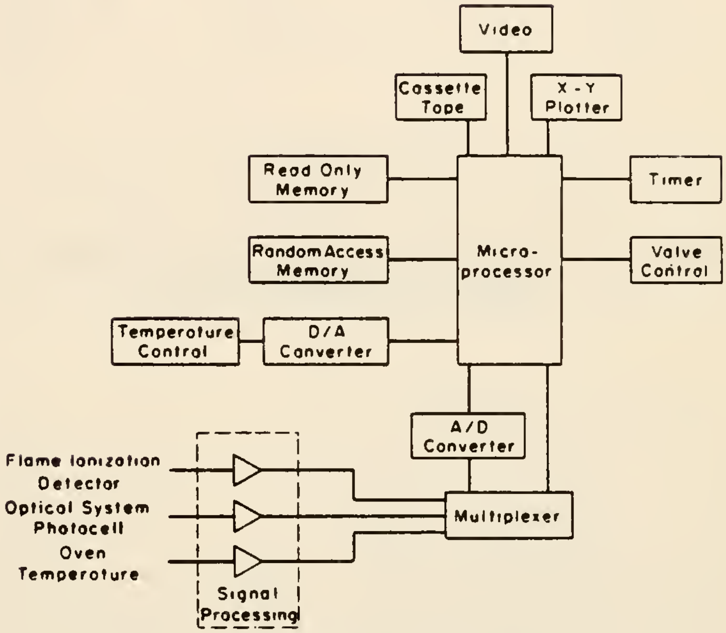

Figure 4. *Block diagram of microprocessor system*

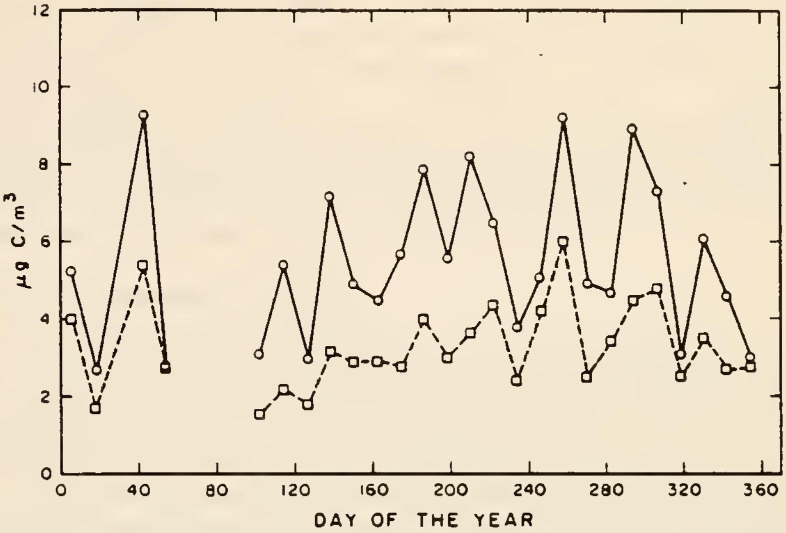

Figure 5. Organic (–○–) and elemental (– –□– –) C concentrations in Detroit, MI—1975. The value r is the correlation coefficient between the organic and elemental C concentrations (r = 0.83).

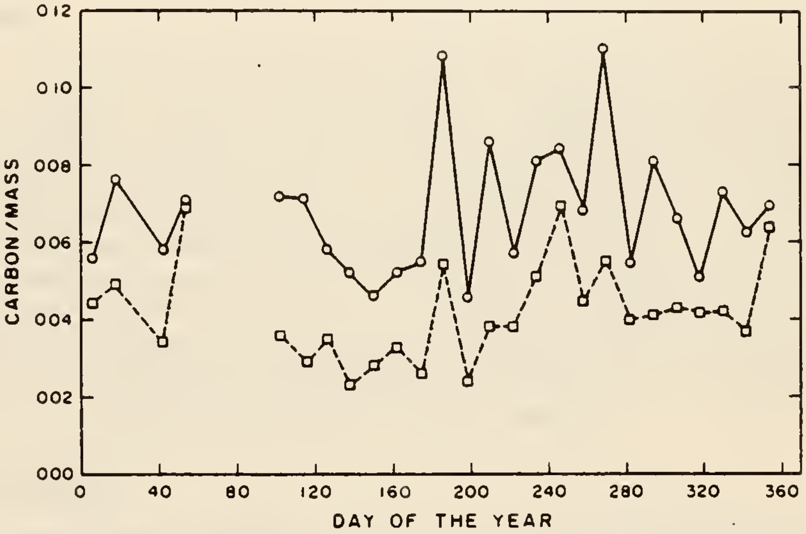

Figure 6. Mass fraction of organic (–○–) and elemental (– –□– –) C in Detroit, MI—aerosol in 1975. Mass is the total mass concentration of aerosol as measured by a high-volume sampler; r is the correlation coefficient between organic and elemental mass fractions (r = 0.60).

The precision of the pyrolytic conversion correction has been assessed by repeated analysis of one high volume filter. For a filter with 36 $\mu g/cm^2$ of organic carbon and 25 $\mu g/cm^2$ of elemental carbon one standard deviation corresponded to ±10% in both the organic and elemental modes.

The analytical sensitivity is limited by uncertainties in the response to blank filters. For glass fiber filters (Gelman A/E) the blank values are 2.8 ± 1.4 $\mu gC/cm^2$ for organic carbon and 0.2 $\mu gC/cm^2$ for elemental carbon. For Pallflex QAST the respective values are 1.0 ± 0.5 and 0.3 ± 0.2 $\mu gC/cm^2$.

Results on Atmospheric Samples

The carbon analyzer has been used to analyze filters from 42 urban sites and 22 non-urban sites in the United States. These filters were obtained from the National Air Surveillance Network (NASN) filter bank for 1975. Carbon concentrations and mass fractions for Detroit, Michigan, are shown in Figures 5 and 6. Both the organic and elemental carbon concentrations are highly variable, and no seasonal trends are apparent. For this site elemental carbon constituted 38% of total aerosol carbon. Typical values for other sites ranged between 35 and 55%.

Filters have also been analyzed from sites in the vicinity of a Lurgi coal gasifier (16) and in the Ohio River Valley. Both these results and the NASN results will be discussed in detail elsewhere.

Summary

An instrument employing both thermal and optical measurements has been developed for the analysis of organic and elemental carbon on glass or quartz fiber filters. During the thermal analysis the reflectance of the filter is continuously monitored to permit a quantitative correction for the pyrolytic production of elemental carbon which occurs during the organic analysis. This correction has been shown to be significant--typically 22% of both organic and elemental carbon. The instrument is completely automated and is under the control of a microprocessor system. It has been used to measure organic and elemental carbon concentrations from both urban and rural sites in the United States. For urban sites the concentrations of both forms of carbon are highly variable with organic carbon slightly more abundant.

Acknowledgment

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ATMOSPHERIC AEROSOL: SOURCE/AIR QUALITY RELATIONSHIPS
Edward S. Macias and Philip K. Hopke, Editors
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Appendix D

Computer Source Codes

```
00001  TRANS  VEHICLE EXHAUST AND TIRE WEAR
00002  RDOIL  RESIDUAL OIL COMBUSTION
00003  GEO A
00004  GEO-B
00005  GEO-C
00006  GEO-D
00007  GEO-E
00008  GEO-F
00009  GEO-G
00010  GEO-H
00011  GEO-I
00012  GEO-J
00013  GEO-K
00014  GEO-L
00015  GEO-M
00016  GEO-N
00017  GEO-O
00018  GEO-P
00019  GEO-Q
00020  GEO-R
00021  GEO-S
00022  CLNUP   RS356  I-1
00023  DROSS   RS358  I-2
00024  SINT    RS360  I-3
00025  SULF    RS362  I-4
00026  LIME    RS364  I-5
00027  BLSTD   RS366  I-7
00028  ACIDD   RS370  I-8
00029  SODA    RS374  I-9
00030  ZNOAS   RS378  I-10
00031  CUKLN   RS376  I-11
00032  ZNFUM   RS380  I-12
00033  COKBN   RS382  I-14
00034  COKBD   RS384  I-15
00035  COKCL   RS388  I-16
00036  COAL1   RS567  I-17
00037  COAL2   RS568  I-18
00038  COAL3   RS569  I-19
00039  RDSLS   RS412  I-20
00040  ASRED   RS404  II-2
00041  ACBLK   RS406  II-3
00042  COKRR   RL044  III-1
00043  SPISS   RL040  III-3
00044  SLAGW   RS396  IV-1
00045  SLAGC   RS398  IV-2
00046  SLAGS   RS400  IV-3
00047  SLAGM   RS402  IV-4
00048  ORE-A
00049  ORE-B
00050  ORE-C
00051  ORE-D
00052  ORE-E
00053  ORE-F
00054  ORE-G
00055  ORE-H
```

```
00056  ORE-I
00057  ORE-J
00058  ORE-K
00059  ORE-L
00060  ORE-M
00061  ORE-N
00062  DLBLD   HD375  D & L BUILDING
00063  NDBLD   HD381  NEW DEAL
00064  ZNBLD   HD391  ZINC PLANT
00065  DRBLD   HD393  DROSS BLDG
00066  ZNBGB   HD403  ZINC BAGHOUSE
00067  BLFUP   HD409  BLAST F UPSET
00068  MSSTK   HD387  MAIN SINTER ST
00069  ZNSTK   HD401  ZINC STACK DSS
00070  BGSTK   HD411  BAGHOUSE STACK
00071  SLPOR   HT304  SLAG POUR
00072  ZNKLR   HD415  ZINC KILN ROOM
00073  ZNKLD   HT301  ZINC KLN DISCH
00074  CUKST   HT305  CU KILN STACK
00075  CUINC  HT319
00076  DIESL
00077  SECSO
00078  ORCOM   WEIGHTED AVERAGE OF ALL ORE COMPOSITES
00079  WSTOV
00080  DUMMY
```

Appendix E

Source Elemental Compositions - Fine Fraction

```
USER: E400

SORF

******************************************************************************
******************************************************************************


MMMMM M      MMM   MMM
M     M  M  M   M M   M
M     M  M  M   M M   M
MMMM  MMMMM M M M M M M
M        M  M   M M   M
M        M  M   M M   M
MMMMM    M   MMM   MMM



 MMM   MMM  MMMM  MMMMM
M   M M   M M   M M
M     M   M M   M M
 MMM  M   M MMMM  MMMM
    M M   M M M   M
M   M M   M M  M  M
 MMM   MMM  M   M M



******************************************************************************
******************************************************************************

LABEL:  PRT002  -FORM        -COPIES    1

SPOOLED:  08/27/82 11:20
STARTED:  08/27/82 11:20, ON: CE2P  BY: 0
```

```
0004      82  .167700 +- .031500 PB  FN FRAC TRANSPORTATION
0004      35  .065400 +-  026000 BR  FN FRAC TRANSPORTATION
0004      13  .004600 +-  002390 AL  FN FRAC TRANSPORTATION
0004      14  .009880 +- .004060 SI  FN FRAC TRANSPORTATION
0004      17  .011000 +- .004200 CL  FN FRAC TRANSPORTATION
0004      20  .019160 +- .008660 CA  FN FRAC TRANSPORTATION
0004      22  .000000 +- .000070 TI  FN FRAC TRANSPORTATION
0004      26  .005480 +- .002350 FE  FN FRAC TRANSPORTATION
0004      16  .010400 +- .003800 S   FN FRAC TRANSPORTATION
0004      30  .003500 +- .001300 ZN  FN FRAC TRANSPORTATION
0004      19  .002660 +- .001180 K   FN FRAC TRANSPORTATION
0004      25  .001180 +- .000510 MN  FN FRAC TRANSPORTATION
0004      28  .000760 +- .000080 NI  FN FRAC TRANSPORTATION
0004      29  .000590 +-  000270 CU  FN FRAC TRANSPORTATION
0005      19  .002800 +-  001000 K   FN FRAC RESID OIL COMB
0005      16  .133000 +-  024000 S   FN FRAC RESID OIL COMB
0005      17  .000000 +- .001000 CL  FN FRAC RESID OIL COMB
0005      13  .005300 +- .002400 AL  FN FRAC RESID OIL COMB
0005      14  .009600 +- .004800 SI  FN FRAC RESID OIL COMB
0005      20  .015800 +- .006400 CA  FN FRAC RESID OIL COMB
0005      22  .001100 +- .000380 TI  FN FRAC RESID OIL COMB
0005      23  .034400 +- .007500 V   FN FRAC RESID OIL COMB
0005      24  .000470 +- .000150 CR  FN FRAC RESID OIL COMB
0005      25  .000460 +- .000130 MN  FN FRAC RESID OIL COMB
0005      26  .029700 +- .006100 FE  FN FRAC RESID OIL COMB
0005      28  .053600 +- .012100 NI  FN FRAC RESID OIL COMB
0005      29  .000750 +- .000250 CU  FN FRAC RESID OIL COMB
0005      30  .004000 +- .001800 ZN  FN FRAC RESID OIL COMB
0005      35  .000130 +- .000210 BR  FN FRAC RESID OIL COMB
0005      82  .001100 +-  000640 PB  FN FRAC RESID OIL COMB
0011      13 0.149900 +-0.014990   AL  F  RS555   COMPOSITE A
0011      14 0.444560 +-0.044456   SI  F  RS555   COMPOSITE A
0011      15 0.003380 +-0.000338   P   F  RS555   COMPOSITE A
0011      16 0.002740 +-0.000510   S   F  RS555   COMPOSITE A
0011      17 0.001620 +-0.000260   CL  F  RS555   COMPOSITE A
0011      19 0.022220 +-0.002222   K   F  RS555   COMPOSITE A
0011      20 0.023680 +-0.002368   CA  F  RS555   COMPOSITE A
0011      22 0.004610 +-0.000461   TI  F  RS555   COMPOSITE A
0011      23 0.000160 +-0.000050   V   F  RS555   COMPOSITE A
0011      24 0.000320 +-0.000050   CR  F  RS555   COMPOSITE A
0011      25 0.000800 +-0.000080   MN  F  RS555   COMPOSITE A
0011      26 0.043720 +-0.004372   FE  F  RS555   COMPOSITE A
0011      28 0.000130 +-0.000040   NI  F  RS555   COMPOSITE A
0011      29 0.000170 +-0 000050   CU  F  RS555   COMPOSITE A
0011      30 0.000650 +-0.000070   ZN  F  RS555   COMPOSITE A
0011      33 0.000000 +-0 000090   AS  F  RS555   COMPOSITE A
0011      34 0.000000 +-0.000030   SE  F  RS555   COMPOSITE A
0011      35 0.000100 +-0.000040   BR  F  RS555   COMPOSITE A
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0011      47 0.000360 +-0.000270   AG  F  RS555   COMPOSITE A
0011      48 0.000360 +-0.000390   CD  F  RS555   COMPOSITE A
0011      49 0 000000 +-0.000430   IN  F  RS555   COMPOSITE A
0011      50 0.000720 +-0.000480   SN  F  RS555   COMPOSITE A
0011      51 0.000430 +-0.000830   SB  F  RS555   COMPOSITE A
```

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0012     15 0.002070 +-0.000207   P    F   RS557    COMPOSITE B
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0012     20 0.101980 +-0.010198   CA   F   RS557    COMPOSITE B
0012     22 0.003090 +-0.000309   TI   F   RS557    COMPOSITE B
0012     23 0.000200 +-0.000030   V    F   RS557    COMPOSITE B
0012     24 0.000140 +-0.000020   CR   F   RS557    COMPOSITE B
0012     25 0.000580 +-0.000058   MN   F   RS557    COMPOSITE B
0012     26 0.025490 +-0.002549   FE   F   RS557    COMPOSITE B
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0012     29 0.000090 +-0.000020   CU   F   RS557    COMPOSITE B
0012     30 0.000500 +-0.000050   ZN   F   RS557    COMPOSITE B
0012     33 0.000130 +-0.000060   AS   F   RS557    COMPOSITE B
0012     34 0.000000 +-0.000020   SE   F   RS557    COMPOSITE B
0012     35 0.000030 +-0.000020   BR   F   RS557    COMPOSITE B
0012     38 0.000160 +-0.000030   SR   F   RS557    COMPOSITE B
0012     46 0.000020 +-0.000090   PD   F   RS557    COMPOSITE B
0012     47 0.000040 +-0.000130   AG   F   RS557    COMPOSITE B
0012     48 0.000220 +-0.000200   CD   F   RS557    COMPOSITE B
0012     49 0.000000 +-0.000210   IN   F   RS557    COMPOSITE B
0012     50 0.000300 +-0.000230   SN   F   RS557    COMPOSITE B
0012     51 0.000410 +-0.000420   SB   F   RS557    COMPOSITE B
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0012     80 0.000010 +-0.000030   HG   F   RS557    COMPOSITE B
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0013     14 0.352630 +-0.035263   SI   F   RS559    COMPOSITE C
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0013     17 0.002040 +-0.000240   CL   F   RS559    COMPOSITE C
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0013     22 0.003550 +-0.000355   TI   F   RS559    COMPOSITE C
0013     23 0.000240 +-0.000040   V    F   RS559    COMPOSITE C
0013     24 0.000180 +-0.000030   CR   F   RS559    COMPOSITE C
0013     25 0.001030 +-0.000103   MN   F   RS559    COMPOSITE C
0013     26 0.035580 +-0.003558   FE   F   RS559    COMPOSITE C
0013     28 0.000040 +-0.000030   NI   F   RS559    COMPOSITE C
0013     29 0.000150 +-0.000030   CU   F   RS559    COMPOSITE C
0013     30 0.000790 +-0.000079   ZN   F   RS559    COMPOSITE C
0013     33 0.000080 +-0.000100   AS   F   RS559    COMPOSITE C
0013     34 0.000000 +-0.000020   SE   F   RS559    COMPOSITE C
0013     35 0.000190 +-0.000030   BR   F   RS559    COMPOSITE C
0013     38 0.000270 +-0.000050   SR   F   RS559    COMPOSITE C
0013     46 0.000000 +-0.000130   PD   F   RS559    COMPOSITE C
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0013     49 0.000000 +-0.000310   IN   F   RS559    COMPOSITE C
0013     50 0.000370 +-0.000340   SN   F   RS559    COMPOSITE C
0013     51 0.000650 +-0.000610   SB   F   RS559    COMPOSITE C
```

```
0013     56 0.001620 +-0.001670   BA   F   RS559    COMPOSITE C
0013     80 0.000020 +-0.000040   HG   F   RS559    COMPOSITE C
0013     82 0.002350 +-0.000235   PB   F   RS559    COMPOSITE C
0014     13 0.128780 +-0.012878   AL   F   RS452   COMPOSITE D
0014     14 0.428020 +-0.042802   SI   F   RS452   COMPOSITE D
0014     15 0.003820 +-0.000382   P    F   RS452   COMPOSITE D
0014     16 0.007030 +-0.000900   S    F   RS452   COMPOSITE D
0014     17 0.001630 +-0.000270   CL   F   RS452   COMPOSITE D
0014     19 0.020230 +-0.002023   K    F   RS452   COMPOSITE D
0014     20 0.006790 +-0.000679   CA   F   RS452   COMPOSITE D
0014     22 0.005190 +-0.000519   TI   F   RS452   COMPOSITE D
0014     23 0.000300 +-0.000050   V    F   RS452   COMPOSITE D
0014     24 0.000120 +-0.000040   CR   F   RS452   COMPOSITE D
0014     25 0.001050 +-0.000105   MN   F   RS452   COMPOSITE D
0014     26 0.051130 +-0.005113   FE   F   RS452   COMPOSITE D
0014     28 0.000090 +-0.000040   NI   F   RS452   COMPOSITE D
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0014     33 0.000910 +-0.000210   AS   F   RS452   COMPOSITE D
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0014     35 0.000510 +-0.000060   BR   F   RS452   COMPOSITE D
0014     38 0.000070 +-0.000050   SR   F   RS452   COMPOSITE D
0014     46 0.000160 +-0.000150   PD   F   RS452   COMPOSITE D
0014     47 0.000000 +-0.000220   AG   F   RS452   COMPOSITE D
0014     48 0.000390 +-0.000320   CD   F   RS452   COMPOSITE D
0014     49 0.000000 +-0.000380   IN   F   RS452   COMPOSITE D
0014     50 0.000190 +-0.000430   SN   F   RS452   COMPOSITE D
0014     51 0.000040 +-0.000770   SB   F   RS452   COMPOSITE D
0014     56 0.000280 +-0.002020   BA   F   RS452   COMPOSITE D
0014     80 0.000070 +-0.000060   HG   F   RS452   COMPOSITE D
0014     82 0.011080 +-0.001108   PB   F   RS452   COMPOSITE D
0015     13 0.114770 +-0.011477   AL   F   RS424   COMPOSITE E
0015     14 0.353850 +-0.035385   SI   F   RS424   COMPOSITE E
0015     15 0.004190 +-0.000419   P    F   RS424   COMPOSITE E
0015     16 0.009290 +-0.000929   S    F   RS424   COMPOSITE E
0015     17 0.001930 +-0.000210   CL   F   RS424   COMPOSITE E
0015     19 0.019080 +-0.001908   K    F   RS424   COMPOSITE E
0015     20 0.030010 +-0.003001   CA   F   RS424   COMPOSITE E
0015     22 0.004540 +-0.000454   TI   F   RS424   COMPOSITE E
0015     23 0.000310 +-0.000040   V    F   RS424   COMPOSITE E
0015     24 0.000270 +-0.000030   CR   F   RS424   COMPOSITE E
0015     25 0.001090 +-0.000109   MN   F   RS424   COMPOSITE E
0015     26 0.044460 +-0.004446   FE   F   RS424   COMPOSITE E
0015     28 0.000130 +-0.000020   NI   F   RS424   COMPOSITE E
0015     29 0.007240 +-0.000724   CU   F   RS424   COMPOSITE E
0015     30 0.008570 +-0.000857   ZN   F   RS424   COMPOSITE E
0015     33 0.000820 +-0.000160   AS   F   RS424   COMPOSITE E
0015     34 0.000040 +-0.000020   SE   F   RS424   COMPOSITE E
0015     35 0.000470 +-0.000047   BR   F   RS424   COMPOSITE E
0015     38 0.000210 +-0.000030   SR   F   RS424   COMPOSITE E
0015     46 0.000000 +-0.000090   PD   F   RS424   COMPOSITE E
0015     47 0.000080 +-0.000120   AG   F   RS424   COMPOSITE E
0015     48 0.000160 +-0.000180   CD   F   RS424   COMPOSITE E
0015     49 0.000000 +-0.000170   IN   F   RS424   COMPOSITE E
0015     50 0.000630 +-0.000200   SN   F   RS424   COMPOSITE E
0015     51 0.000280 +-0.000380   SB   F   RS424   COMPOSITE E
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0015     56 0.000000 +-0.000980   BA   F   RS424   COMPOSITE E
0015     80 0.000070 +-0.000040   HG   F   RS424   COMPOSITE E
0015     82 0.013670 +-0.001367   PB   F   RS424   COMPOSITE E
0016     13 0.120940 +-0.012094   AL   F   RS454   COMPOSITE F
0016     14 0.353910 +-0.035391   SI   F   RS454   COMPOSITE F
0016     15 0.003080 +-0.000310   P    F   RS454   COMPOSITE F
0016     16 0.011680 +-0.001180   S    F   RS454   COMPOSITE F
0016     17 0.004060 +-0.000460   CL   F   RS454   COMPOSITE F
0016     19 0.018830 +-0.001883   K    F   RS454   COMPOSITE F
0016     20 0.027500 +-0.002750   CA   F   RS454   COMPOSITE F
0016     22 0.004370 +-0.000437   TI   F   RS454   COMPOSITE F
0016     23 0.000290 +-0.000060   V    F   RS454   COMPOSITE F
0016     24 0.000090 +-0.000050   CR   F   RS454   COMPOSITE F
0016     25 0.001810 +-0.000181   MN   F   RS454   COMPOSITE F
0016     26 0.049600 +-0.004960   FE   F   RS454   COMPOSITE F
0016     28 0.000030 +-0.000050   NI   F   RS454   COMPOSITE F
0016     29 0.001510 +-0.000151   CU   F   RS454   COMPOSITE F
0016     30 0.003170 +-0.000317   ZN   F   RS454   COMPOSITE F
0016     33 0.000700 +-0.000190   AS   F   RS454   COMPOSITE F
0016     34 0.000070 +-0.000030   SE   F   RS454   COMPOSITE F
0016     35 0.000670 +-0.000080   BR   F   RS454   COMPOSITE F
0016     38 0.000260 +-0.000070   SR   F   RS454   COMPOSITE F
0016     46 0.000110 +-0.000180   PD   F   RS454   COMPOSITE F
0016     47 0.000000 +-0.000280   AG   F   RS454   COMPOSITE F
0016     48 0.000280 +-0.000400   CD   F   RS454   COMPOSITE F
0016     49 0.000000 +-0.000490   IN   F   RS454   COMPOSITE F
0016     50 0.000000 +-0.000530   SN   F   RS454   COMPOSITE F
0016     51 0.000000 +-0.000930   SB   F   RS454   COMPOSITE F
0016     56 0.002850 +-0.002620   BA   F   RS454   COMPOSITE F
0016     80 0.000000 +-0.000060   HG   F   RS454   COMPOSITE F
0016     82 0.006220 +-0.000622   PB   F   RS454   COMPOSITE F
0017     13 0.082790 +-0.008279   AL   F   RS426   COMPOSITE G
0017     14 0.213510 +-0.021351   SI   F   RS426   COMPOSITE G
0017     15 0.003200 +-0.000320   P    F   RS426   COMPOSITE G
0017     16 0.011340 +-0.001134   S    F   RS426   COMPOSITE G
0017     17 0.001550 +-0.000155   CL   F   RS426   COMPOSITE G
0017     19 0.013000 +-0.001300   K    F   RS426   COMPOSITE G
0017     20 0.035970 +-0.003597   CA   F   RS426   COMPOSITE G
0017     22 0.003110 +-0.000311   TI   F   RS426   COMPOSITE G
0017     23 0.000370 +-0.000037   V    F   RS426   COMPOSITE G
0017     24 0.000430 +-0.000043   CR   F   RS426   COMPOSITE G
0017     25 0.001110 +-0.000111   MN   F   RS426   COMPOSITE G
0017     26 0.113570 +-0.011357   FE   F   RS426   COMPOSITE G
0017     28 0.000270 +-0.000030   NI   F   RS426   COMPOSITE G
0017     29 0.023390 +-0.002339   CU   F   RS426   COMPOSITE G
0017     30 0.015020 +-0.001502   ZN   F   RS426   COMPOSITE G
0017     33 0.001150 +-0.000120   AS   F   RS426   COMPOSITE G
0017     34 0.000040 +-0.000010   SE   F   RS426   COMPOSITE G
0017     35 0.000300 +-0.000030   BR   F   RS426   COMPOSITE G
0017     38 0.000340 +-0.000034   SR   F   RS426   COMPOSITE G
0017     46 0.000060 +-0.000050   PD   F   RS426   COMPOSITE G
0017     47 0.000100 +-0.000070   AG   F   RS426   COMPOSITE G
0017     48 0.000450 +-0.000120   CD   F   RS426   COMPOSITE G
0017     49 0.000050 +-0.000110   IN   F   RS426   COMPOSITE G
0017     50 0.000020 +-0.000130   SN   F   RS426   COMPOSITE G
0017     51 0.000110 +-0.000270   SB   F   RS426   COMPOSITE G
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0017     56 0.000320 +-0.000660   BA   F   RS426   COMPOSITE G
0017     80 0.000030 +-0 000020   HG   F   RS426   COMPOSITE G
0017     82 0.009540 +-0 000954   PB   F   RS426   COMPOSITE G
0018     13 0.077730 +-0.007773   AL   F   RS428   COMPOSITE H
0018     14 0.226270 +-0.022627   SI   F   RS428   COMPOSITE H
0018     15 0.003710 +-0.000430   P    F   RS428   COMPOSITE H
0018     16 0.013920 +-0.001620   S    F   RS428   COMPOSITE H
0018     17 0.002610 +-0.000470   CL   F   RS428   COMPOSITE H
0018     19 0.013170 +-0.001317   K    F   RS428   COMPOSITE H
0018     20 0.023320 +-0.002332   CA   F   RS428   COMPOSITE H
0018     22 0.004630 +-0.000463   TI   F   RS428   COMPOSITE H
0018     23 0.000150 +-0.000070   V    F   RS428   COMPOSITE H
0018     24 0.000400 +-0.000080   CR   F   RS428   COMPOSITE H
0018     25 0.000830 +-0.000100   MN   F   RS428   COMPOSITE H
0018     26 0.039890 +-0.003989   FE   F   RS428   COMPOSITE H
0018     28 0.000280 +-0.000080   NI   F   RS428   COMPOSITE H
0018     29 0.003500 +-0.000350   CU   F   RS428   COMPOSITE H
0018     30 0.003120 +-0.000312   ZN   F   RS428   COMPOSITE H
0018     33 0.000290 +-0.000210   AS   F   RS428   COMPOSITE H
0018     34 0.000040 +-0.000040   SE   F   RS428   COMPOSITE H
0018     35 0.000960 +-0.000120   BR   F   RS428   COMPOSITE H
0018     38 0.000290 +-0.000090   SR   F   RS428   COMPOSITE H
0018     46 0.000000 +-0.000270   PD   F   RS428   COMPOSITE H
0018     47 0.000080 +-0.000370   AG   F   RS428   COMPOSITE H
0018     48 0.000880 +-0.000590   CD   F   RS428   COMPOSITE H
0018     49 0.000060 +-0.000640   IN   F   RS428   COMPOSITE H
0018     50 0.000000 +-0.000710   SN   F   RS428   COMPOSITE H
0018     51 0.000000 +-0.001440   SB   F   RS428   COMPOSITE H
0018     56 0.000000 +-0.003560   BA   F   RS428   COMPOSITE H
0018     80 0.000050 +-0.000100   HG   F   RS428   COMPOSITE H
0018     82 0.005120 +-0.000530   PB   F   RS428   COMPOSITE H
0019     13 0.133430 +-0.013343   AL   F   RS553    COMPOSITE I
0019     14 0.374180 +-0.037418   SI   F   RS553    COMPOSITE I
0019     15 0.002240 +-0.000250   P    F   RS553    COMPOSITE I
0019     16 0.004190 +-0.000600   S    F   RS553    COMPOSITE I
0019     17 0.001810 +-0.000280   CL   F   RS553    COMPOSITE I
0019     19 0.017250 +-0.001725   K    F   RS553    COMPOSITE I
0019     20 0.061940 +-0.006194   CA   F   RS553    COMPOSITE I
0019     22 0.007410 +-0.000741   TI   F   RS553    COMPOSITE I
0019     23 0.000390 +-0.000070   V    F   RS553    COMPOSITE I
0019     24 0.000210 +-0.000050   CR   F   RS553    COMPOSITE I
0019     25 0.000490 +-0.000060   MN   F   RS553    COMPOSITE I
0019     26 0.023400 +-0.002340   FE   F   RS553    COMPOSITE I
0019     28 0.000070 +-0.000040   NI   F   RS553    COMPOSITE I
0019     29 0.000130 +-0.000050   CU   F   RS553    COMPOSITE I
0019     30 0.000280 +-0.000050   ZN   F   RS553    COMPOSITE I
0019     33 0.000100 +-0.000090   AS   F   RS553    COMPOSITE I
0019     34 0.000000 +-0.000030   SE   F   RS553    COMPOSITE I
0019     35 0.000040 +-0.000040   BR   F   RS553    COMPOSITE I
0019     38 0.000270 +-0.000070   SR   F   RS553    COMPOSITE I
0019     46 0.000520 +-0.000190   PD   F   RS553    COMPOSITE I
0019     47 0.000000 +-0.000250   AG   F   RS553    COMPOSITE I
0019     48 0.000000 +-0.000390   CD   F   RS553    COMPOSITE I
0019     49 0.000000 +-0.000420   IN   F   RS553    COMPOSITE I
0019     50 0.000000 +-0.000460   SN   F   RS553    COMPOSITE I
0019     51 0.000280 +-0.000890   SB   F   RS553    COMPOSITE I
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0019      56 0.003200 +-0.002500   BA   F   RS553    COMPOSITE I
0019      80 0.000000 +-0.000060   HG   F   RS553    COMPOSITE I
0019      82 0.000420 +-0.000140   PB   F   RS553    COMPOSITE I
0020      13 0.088210 +-0.008821   AL   F   RS456   COMPOSITE J
0020      14 0.263340 +-0.026334   SI   F   RS456   COMPOSITE J
0020      15 0.002870 +-0.000400   P    F   RS456   COMPOSITE J
0020      16 0.020760 +-0.002510   S    F   RS456   COMPOSITE J
0020      17 0.003730 +-0.000610   CL   F   RS456   COMPOSITE J
0020      19 0.015600 +-0.001560   K    F   RS456   COMPOSITE J
0020      20 0.058590 +-0.005859   CA   F   RS456   COMPOSITE J
0020      22 0.003490 +-0.000350   TI   F   RS456   COMPOSITE J
0020      23 0.000230 +-0.000070   V    F   RS456   COMPOSITE J
0020      24 0.000090 +-0.000070   CR   F   RS456   COMPOSITE J
0020      25 0.001400 +-0.000150   MN   F   RS456   COMPOSITE J
0020      26 0.038850 +-0.003885   FE   F   RS456   COMPOSITE J
0020      28 0.000050 +-0.000070   NI   F   RS456   COMPOSITE J
0020      29 0.003820 +-0.000382   CU   F   RS456   COMPOSITE J
0020      30 0.012890 +-0.001289   ZN   F   RS456   COMPOSITE J
0020      33 0.003420 +-0.000520   AS   F   RS456   COMPOSITE J
0020      34 0.000110 +-0.000050   SE   F   RS456   COMPOSITE J
0020      35 0.001080 +-0.000130   BR   F   RS456   COMPOSITE J
0020      38 0.000220 +-0.000100   SR   F   RS456   COMPOSITE J
0020      46 0.000100 +-0.000270   PD   F   RS456   COMPOSITE J
0020      47 0.000240 +-0.000430   AG   F   RS456   COMPOSITE J
0020      48 0.002260 +-0.000680   CD   F   RS456   COMPOSITE J
0020      49 0.000000 +-0.000690   IN   F   RS456   COMPOSITE J
0020      50 0.000480 +-0.000790   SN   F   RS456   COMPOSITE J
0020      51 0.001230 +-0.001470   SB   F   RS456   COMPOSITE J
0020      56 0.000990 +-0.003760   BA   F   RS456   COMPOSITE J
0020      80 0.000150 +-0.000120   HG   F   RS456   COMPOSITE J
0020      82 0.024730 +-0.002473   PB   F   RS456   COMPOSITE J
0021      13 0.083860 +-0.008386   AL   F   RS458   COMPOSITE K
0021      14 0.245190 +-0.024519   SI   F   RS458   COMPOSITE K
0021      15 0.002940 +-0.000370   P    F   RS458   COMPOSITE K
0021      16 0.030110 +-0.003370   S    F   RS458   COMPOSITE K
0021      17 0.001900 +-0.000520   CL   F   RS458   COMPOSITE K
0021      19 0.013280 +-0.001328   K    F   RS458   COMPOSITE K
0021      20 0.050210 +-0.005021   CA   F   RS458   COMPOSITE K
0021      22 0.003240 +-0.000324   TI   F   RS458   COMPOSITE K
0021      23 0.000250 +-0.000060   V    F   RS458   COMPOSITE K
0021      24 0.000220 +-0.000070   CR   F   RS458   COMPOSITE K
0021      25 0.001530 +-0.000153   MN   F   RS458   COMPOSITE K
0021      26 0.043310 +-0.004331   FE   F   RS458   COMPOSITE K
0021      28 0.000410 +-0.000090   NI   F   RS458   COMPOSITE K
0021      29 0.014170 +-0.001417   CU   F   RS458   COMPOSITE K
0021      30 0.055080 +-0.005508   ZN   F   RS458   COMPOSITE K
0021      33 0.006020 +-0.000710   AS   F   RS458   COMPOSITE K
0021      34 0.000190 +-0.000060   SE   F   RS458   COMPOSITE K
0021      35 0.001050 +-0.000120   BR   F   RS458   COMPOSITE K
0021      38 0.000370 +-0.000090   SR   F   RS458   COMPOSITE K
0021      46 0.000320 +-0.000250   PD   F   RS458   COMPOSITE K
0021      47 0.000210 +-0.000380   AG   F   RS458   COMPOSITE K
0021      48 0.004160 +-0.000730   CD   F   RS458   COMPOSITE K
0021      49 0.000000 +-0.000630   IN   F   RS458   COMPOSITE K
0021      50 0.000690 +-0.000710   SN   F   RS458   COMPOSITE K
0021      51 0.000620 +-0.001280   SB   F   RS458   COMPOSITE K
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0021      56 0.006380 +-0.003450  BA  F  RS458  COMPOSITE K
0021      80 0.000360 +-0.000130  HG  F  RS458  COMPOSITE K
0021      82 0.042480 +-0.004248  PB  F  RS458  COMPOSITE K
0022      13 0.101930 +-0.010193  AL  F  RS460  COMPOSITE L
0022      14 0.296040 +-0.029604  SI  F  RS460  COMPOSITE L
0022      15 0.003590 +-0.000359  P   F  RS460  COMPOSITE L
0022      16 0.019690 +-0.001969  S   F  RS460  COMPOSITE L
0022      17 0.002010 +-0.000350  CL  F  RS460  COMPOSITE L
0022      19 0.018910 +-0.001891  K   F  RS460  COMPOSITE L
0022      20 0.034030 +-0.003403  CA  F  RS460  COMPOSITE L
0022      22 0.003690 +-0.000369  TI  F  RS460  COMPOSITE L
0022      23 0.000180 +-0.000050  V   F  RS460  COMPOSITE L
0022      24 0.000280 +-0.000050  CR  F  RS460  COMPOSITE L
0022      25 0.001230 +-0.000123  MN  F  RS460  COMPOSITE L
0022      26 0.047790 +-0.004779  FE  F  RS460  COMPOSITE L
0022      28 0.000220 +-0.000050  NI  F  RS460  COMPOSITE L
0022      29 0.007080 +-0.000708  CU  F  RS460  COMPOSITE L
0022      30 0.032710 +-0.003271  ZN  F  RS460  COMPOSITE L
0022      33 0.002800 +-0.000330  AS  F  RS460  COMPOSITE L
0022      34 0.000130 +-0.000040  SE  F  RS460  COMPOSITE L
0022      35 0.000520 +-0.000060  BR  F  RS460  COMPOSITE L
0022      38 0.000280 +-0.000060  SR  F  RS460  COMPOSITE L
0022      46 0.000040 +-0.000170  PD  F  RS460  COMPOSITE L
0022      47 0.000300 +-0.000240  AG  F  RS460  COMPOSITE L
0022      48 0.000480 +-0.000400  CD  F  RS460  COMPOSITE L
0022      49 0.000000 +-0.000380  IN  F  RS460  COMPOSITE L
0022      50 0.000990 +-0.000460  SN  F  RS460  COMPOSITE L
0022      51 0.000180 +-0.000900  SB  F  RS460  COMPOSITE L
0022      56 0.001000 +-0.002290  BA  F  RS460  COMPOSITE L
0022      80 0.000190 +-0.000080  HG  F  RS460  COMPOSITE L
0022      82 0.019960 +-0.001996  PB  F  RS460  COMPOSITE L
0023      13 0.033740 +-0.003374  AL  F  RS434  COMPOSITE M
0023      14 0.094520 +-0.009452  SI  F  RS434  COMPOSITE M
0023      15 0.001160 +-0.000290  P   F  RS434  COMPOSITE M
0023      16 0.014020 +-0.001402  S   F  RS434  COMPOSITE M
0023      17 0.003640 +-0.000364  CL  F  RS434  COMPOSITE M
0023      19 0.009700 +-0.000970  K   F  RS434  COMPOSITE M
0023      20 0.255850 +-0.025585  CA  F  RS434  COMPOSITE M
0023      22 0.001120 +-0.000112  TI  F  RS434  COMPOSITE M
0023      23 0.000110 +-0.000020  V   F  RS434  COMPOSITE M
0023      24 0.000080 +-0.000020  CR  F  RS434  COMPOSITE M
0023      25 0.000620 +-0.000062  MN  F  RS434  COMPOSITE M
0023      26 0.014720 +-0.001472  FE  F  RS434  COMPOSITE M
0023      28 0.000060 +-0.000020  NI  F  RS434  COMPOSITE M
0023      29 0.001450 +-0.000145  CU  F  RS434  COMPOSITE M
0023      30 0.004020 +-0.000402  ZN  F  RS434  COMPOSITE M
0023      33 0.001390 +-0.000150  AS  F  RS434  COMPOSITE M
0023      34 0.000020 +-0.000010  SE  F  RS434  COMPOSITE M
0023      35 0.000190 +-0.000020  BR  F  RS434  COMPOSITE M
0023      38 0.000260 +-0.000030  SR  F  RS434  COMPOSITE M
0023      46 0.000030 +-0 000070  PD  F  RS434  COMPOSITE M
0023      47 0.000280 +-0.000100  AG  F  RS434  COMPOSITE M
0023      48 0.000640 +-0.000160  CD  F  RS434  COMPOSITE M
0023      49 0.000000 +-0.000150  IN  F  RS434  COMPOSITE M
0023      50 0.000100 +-0.000180  SN  F  RS434  COMPOSITE M
0023      51 0.000020 +-0.000370  SB  F  RS434  COMPOSITE M
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0023     56 0.000000 +-0.000900   BA   F   RS434   COMPOSITE M
0023     80 0.000060 +-0.000030   HG   F   RS434   COMPOSITE M
0023     82 0.012150 +-0.001215   PB   F   RS434   COMPOSITE M
0024     13 0.105230 +-0.010523   AL   F   RS436   COMPOSITE H
0024     14 0.309820 +-0.030982   SI   F   RS436   COMPOSITE H
0024     15 0.003370 +-0.000337   P    F   RS436   COMPOSITE H
0024     16 0.014730 +-0.001473   S    F   RS436   COMPOSITE H
0024     17 0.001740 +-0.000240   CL   F   RS436   COMPOSITE H
0024     19 0.017480 +-0.001748   K    F   RS436   COMPOSITE H
0024     20 0.041840 +-0.004184   CA   F   RS436   COMPOSITE H
0024     22 0.003590 +-0.000359   TI   F   RS436   COMPOSITE H
0024     23 0.000260 +-0.000040   V    F   RS436   COMPOSITE H
0024     24 0.000290 +-0.000040   CR   F   RS436   COMPOSITE H
0024     25 0.001060 +-0.000106   MN   F   RS436   COMPOSITE H
0024     26 0.042840 +-0.004284   FE   F   RS436   COMPOSITE H
0024     28 0.000180 +-0.000030   NI   F   RS436   COMPOSITE H
0024     29 0.002290 +-0.000229   CU   F   RS436   COMPOSITE H
0024     30 0.006620 +-0.000662   ZN   F   RS436   COMPOSITE H
0024     33 0.001610 +-0.000200   AS   F   RS436   COMPOSITE H
0024     34 0.000070 +-0.000020   SE   F   RS436   COMPOSITE H
0024     35 0.000390 +-0.000040   BR   F   RS436   COMPOSITE H
0024     38 0.000260 +-0.000040   SR   F   RS436   COMPOSITE H
0024     46 0.000050 +-0.000110   PD   F   RS436   COMPOSITE H
0024     47 0.000080 +-0.000150   AG   F   RS436   COMPOSITE H
0024     48 0.000490 +-0.000230   CD   F   RS436   COMPOSITE H
0024     49 0.000000 +-0.000230   IN   F   RS436   COMPOSITE H
0024     50 0.000330 +-0.000290   SN   F   RS436   COMPOSITE H
0024     51 0.000000 +-0.000560   SB   F   RS436   COMPOSITE H
0024     56 0.000000 +-0.001400   BA   F   RS436   COMPOSITE H
0024     80 0.000050 +-0.000050   HG   F   RS436   COMPOSITE H
0024     82 0.012980 +-0.001298   PB   F   RS436   COMPOSITE H
0025     13 0.080920 +-0.008092   AL   F   RS438   COMPOSITE O
0025     14 0.239470 +-0.023947   SI   F   RS438   COMPOSITE O
0025     15 0.003900 +-0.000390   P    F   RS438   COMPOSITE O
0025     16 0.046580 +-0.004658   S    F   RS438   COMPOSITE O
0025     17 0.000990 +-0.000380   CL   F   RS438   COMPOSITE O
0025     19 0.015860 +-0.001586   K    F   RS438   COMPOSITE O
0025     20 0.062720 +-0.006272   CA   F   RS438   COMPOSITE O
0025     22 0.002890 +-0.000289   TI   F   RS438   COMPOSITE O
0025     23 0.000370 +-0.000040   V    F   RS438   COMPOSITE O
0025     24 0.000400 +-0.000040   CR   F   RS438   COMPOSITE O
0025     25 0.002860 +-0.000286   MN   F   RS438   COMPOSITE O
0025     26 0.049670 +-0.004967   FE   F   RS438   COMPOSITE O
0025     28 0.000380 +-0.000050   NI   F   RS438   COMPOSITE O
0025     29 0.022200 +-0.002220   CU   F   RS438   COMPOSITE O
0025     30 0.035560 +-0.003556   ZN   F   RS438   COMPOSITE O
0025     33 0.011210 +-0.001121   AS   F   RS438   COMPOSITE O
0025     34 0.000300 +-0.000040   SE   F   RS438   COMPOSITE O
0025     35 0.001170 +-0.000117   BR   F   RS438   COMPOSITE O
0025     38 0.000720 +-0.000072   SR   F   RS438   COMPOSITE O
0025     46 0.000040 +-0.000100   PD   F   RS438   COMPOSITE O
0025     47 0.000630 +-0.000170   AG   F   RS438   COMPOSITE O
0025     48 0.003490 +-0.000390   CD   F   RS438   COMPOSITE O
0025     49 0.000130 +-0.000250   IN   F   RS438   COMPOSITE O
0025     50 0.000880 +-0.000280   SN   F   RS438   COMPOSITE O
0025     51 0.003830 +-0.000690   SB   F   RS438   COMPOSITE O
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0025     56 0.000000 +-0.001380   BA   F   RS438   COMPOSITE O
0025     80 0.000480 +-0.000090   HG   F   RS438   COMPOSITE O
0025     82 0.062440 +-0.006244   PB   F   RS438   COMPOSITE O
0026     13 0.101520 +-0.010152   AL   F   RS440   COMPOSITE P
0026     14 0.295020 +-0.029502   SI   F   RS440   COMPOSITE P
0026     15 0.003380 +-0.000360   P    F   RS440   COMPOSITE P
0026     16 0.018550 +-0.002030   S    F   RS440   COMPOSITE P
0026     17 0.002260 +-0.000460   CL   F   RS440   COMPOSITE P
0026     19 0.017450 +-0.001745   K    F   RS440   COMPOSITE P
0026     20 0.022500 +-0.002250   CA   F   RS440   COMPOSITE P
0026     22 0.003640 +-0.000364   TI   F   RS440   COMPOSITE P
0026     23 0.000690 +-0.000090   V    F   RS440   COMPOSITE P
0026     24 0.000330 +-0.000070   CR   F   RS440   COMPOSITE P
0026     25 0.001310 +-0.000131   MN   F   RS440   COMPOSITE P
0026     26 0.045830 +-0.004583   FE   F   RS440   COMPOSITE P
0026     28 0.000220 +-0.000070   NI   F . RS440   COMPOSITE P
0026     29 0.004930 +-0.000493   CU   F   RS440   COMPOSITE P
0026     30 0.025730 +-0.002573   ZN   F   RS440   COMPOSITE P
0026     33 0.002190 +-0.000390   AS   F   RS440   COMPOSITE P
0026     34 0.000070 +-0.000050   SE   F   RS440   COMPOSITE P
0026     35 0.001010 +-0.000110   BR   F   RS440   COMPOSITE P
0026     38 0.000260 +-0.000080   SR   F   RS440   COMPOSITE P
0026     46 0.000010 +-0.000250   PD   F   RS440   COMPOSITE P
0026     47 0.000510 +-0.000370   AG   F   RS440   COMPOSITE P
0026     48 0.000000 +-0.000550   CD   F   RS440   COMPOSITE P
0026     49 0.000010 +-0.000580   IN   F   RS440   COMPOSITE P
0026     50 0.000000 +-0.000600   SN   F   RS440   COMPOSITE P
0026     51 0.001200 +-0.001300   SB   F   RS440   COMPOSITE P
0026     56 0.000000 +-0.003230   BA   F   RS440   COMPOSITE P
0026     80 0.000290 +-0.000100   HG   F   RS440   COMPOSITE P
0026     82 0.021420 +-0.002142   PB   F   RS440   COMPOSITE P
0027     13 0.091830 +-0.009183   AL   F   RS443   COMPOSITE Q
0027     14 0.277840 +-0.027784   SI   F   RS443   COMPOSITE Q
0027     15 0.003620 +-0.000362   P    F   RS443   COMPOSITE Q
0027     16 0.021270 +-0.002127   S    F   RS443   COMPOSITE Q
0027     17 0.001430 +-0.000280   CL   F   RS443   COMPOSITE Q
0027     19 0.015430 +-0.001543   K    F   RS443   COMPOSITE Q
0027     20 0.052720 +-0.005272   CA   F   RS443   COMPOSITE Q
0027     22 0.003560 +-0.000356   TI   F   RS443   COMPOSITE Q
0027     23 0.000330 +-0.000040   V    F   RS443   COMPOSITE Q
0027     24 0.000320 +-0.000040   CR   F   RS443   COMPOSITE Q
0027     25 0.001470 +-0.000147   MN   F   RS443   COMPOSITE Q
0027     26 0.050170 +-0.005017   FE   F   RS443   COMPOSITE Q
0027     28 0.000250 +-0.000040   NI   F   RS443   COMPOSITE Q
0027     29 0.006430 +-0.000643   CU   F   RS443   COMPOSITE Q
0027     30 0.029330 +-0.002933   ZN   F   RS443   COMPOSITE Q
0027     33 0.003900 +-0.000390   AS   F   RS443   COMPOSITE Q
0027     34 0.000070 +-0.000030   SE   F   RS443   COMPOSITE Q
0027     35 0.000540 +-0.000054   BR   F   RS443   COMPOSITE Q
0027     38 0.000430 +-0.000050   SR   F   RS443   COMPOSITE Q
0027     46 0.000010 +-0.000120   PD   F   RS443   COMPOSITE Q
0027     47 0.000120 +-0.000170   AG   F   RS443   COMPOSITE Q
0027     48 0.000590 +-0.000280   CD   F   RS443   COMPOSITE Q
0027     49 0.000000 +-0.000270   IN   F   RS443   COMPOSITE Q
0027     50 0.000770 +-0.000310   SN   F   RS443   COMPOSITE Q
0027     51 0.000000 +-0.000590   SB   F   RS443   COMPOSITE Q
```

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0027     56 0.000000 +-0.000410   BA   C   RS444   COMPOSITE Q
0027     80 0.000060 +-0.000020   HG   C   RS444   COMPOSITE Q
0027     82 0.021570 +-0.002157   PB   C   RS444   COMPOSITE Q
0028     13 0.034570 +-0.003457   AL   C   RS446   COMPOSITE R
0028     14 0.118430 +-0.011843   SI   C   RS446   COMPOSITE R
0028     15 0.001400 +-0.000170   P    C   RS446   COMPOSITE R
0028     16 0.007850 +-0.000785   S    C   RS446   COMPOSITE R
0028     17 0.002110 +-0.000211   CL   C   RS446   COMPOSITE R
0028     19 0.012130 +-0.001213   K    C   RS446   COMPOSITE R
0028     20 0.166310 +-0.016631   CA   C   RS446   COMPOSITE R
0028     22 0.002310 +-0.000231   TI   C   RS446   COMPOSITE R
0028     23 0.000150 +-0.000015   V    C   RS446   COMPOSITE R
0028     24 0.000130 +-0.000013   CR   C   RS446   COMPOSITE R
0028     25 0.000690 +-0.000069   MN   C   RS446   COMPOSITE R
0028     26 0.024200 +-0.002420   FE   C   RS446   COMPOSITE R
0028     28 0.000080 +-0.000010   NI   C   RS446   COMPOSITE R
0028     29 0.001460 +-0.000146   CU   C   RS446   COMPOSITE R
0028     30 0.003520 +-0.000352   ZN   C   RS446   COMPOSITE R
0028     33 0.000750 +-0.000075   AS   C   RS446   COMPOSITE R
0028     34 0.000040 +-0.000010   SE   C   RS446   COMPOSITE R
0028     35 0.000110 +-0.000011   BR   C   RS446   COMPOSITE R
0028     38 0.000260 +-0.000026   SR   C   RS446   COMPOSITE R
0028     46 0.000040 +-0.000020   PD   C   RS446   COMPOSITE R
0028     47 0.000080 +-0.000020   AG   C   RS446   COMPOSITE R
0028     48 0.000370 +-0.000050   CD   C   RS446   COMPOSITE R
0028     49 0.000000 +-0.000040   IN   C   RS446   COMPOSITE R
0028     50 0.000110 +-0.000040   SN   C   RS446   COMPOSITE R
0028     51 0.000030 +-0.000080   SB   C   RS446   COMPOSITE R
0028     56 0.000000 +-0.000210   BA   C   RS446   COMPOSITE R
0028     80 0.000070 +-0.000010   HG   C   RS446   COMPOSITE R
0028     82 0.012430 +-0.001243   PB   C   RS446   COMPOSITE R
0029     13 0.063160 +-0.006316   AL   C   RS449   COMPOSITE S
0029     14 0.211420 +-0.021142   SI   C   RS449   COMPOSITE S
0029     15 0.001990 +-0.000199   P    C   RS449   COMPOSITE S
0029     16 0.009940 +-0.000994   S    C   RS449   COMPOSITE S
0029     17 0.000710 +-0.000120   CL   C   RS449   COMPOSITE S
0029     19 0.012110 +-0.001211   K    C   RS449   COMPOSITE S
0029     20 0.032160 +-0.003216   CA   C   RS449   COMPOSITE S
0029     22 0.003150 +-0.000315   TI   C   RS449   COMPOSITE S
0029     23 0.000270 +-0.000027   V    C   RS449   COMPOSITE S
0029     24 0.000300 +-0.000030   CR   C   RS449   COMPOSITE S
0029     25 0.001170 +-0.000117   MN   C   RS449   COMPOSITE S
0029     26 0.052160 +-0.005216   FE   C   RS449   COMPOSITE S
0029     28 0.000360 +-0.000036   NI   C   RS449   COMPOSITE S
0029     29 0.052000 +-0.005200   CU   C   RS449   COMPOSITE S
0029     30 0.030870 +-0.003087   ZN   C   RS449   COMPOSITE S
0029     33 0.001580 +-0.000158   AS   C   RS449   COMPOSITE S
0029     34 0.000050 +-0.000010   SE   C   RS449   COMPOSITE S
0029     35 0.000160 +-0.000020   BR   C   RS449   COMPOSITE S
0029     38 0.000300 +-0.000030   SR   C   RS449   COMPOSITE S
0029     46 0.000020 +-0.000040   PD   C   RS449   COMPOSITE S
0029     47 0.000170 +-0.000060   AG   C   RS449   COMPOSITE S
0029     48 0.000490 +-0.000110   CD   C   RS449   COMPOSITE S
0029     49 0.000000 +-0.000090   IN   C   RS449   COMPOSITE S
0029     50 0.000760 +-0.000120   SN   C   RS449   COMPOSITE S
0029     51 0.000620 +-0.000220   SB   C   RS449   COMPOSITE S
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0029     56 0.000000 +-0.001400   BA  F  RS447  COMPOSITE S
0029     80 0.000160 +-0.000050   HG  F  RS447  COMPOSITE S
0029     82 0.022240 +-0.002224   PB  F  RS447  COMPOSITE S
0030     13 0.097870 +-0.011170   AL  F  RS356  I-1
0030     14 0.234860 +-0.026410   SI  F  RS356  I-1
0030     15 0.000950 +-0.000340   P   F  RS356  I-1
0030     16 0.002110 +-0.000980   S   F  RS356  I-1
0030     17 0.001360 +-0.000460   CL  F  RS356  I-1
0030     19 0.000000 +-0.000610   K   F  RS356  I-1
0030     20 0.006410 +-0.000790   CA  F  RS356  I-1
0030     22 0.000720 +-0.000140   TI  F  RS356  I-1
0030     23 0.000040 +-0.000060   V   F  RS356  I-1
0030     24 0.000090 +-0.000020   CR  F  RS356  I-1
0030     25 0.000930 +-0.000140   MN  F  RS356  I-1
0030     26 0.016790 +-0.001970   FE  F  RS356  I-1
0030     28 0.000000 +-0.000080   NI  F  RS356  I-1
0030     29 0.000260 +-0.000110   CU  F  RS356  I-1
0030     30 0.001260 +-0.000190   ZN  F  RS356  I-1
0030     33 0.000000 +-0.000200   AS  F  RS356  I-1
0030     34 0.000090 +-0.000060   SE  F  RS356  I-1
0030     35 0.000150 +-0.000090   BR  F  RS356  I-1
0030     38 0.000050 +-0.000130   SR  F  RS356  I-1
0030     46 0.000000 +-0.000390   PD  F  RS356  I-1
0030     47 0.000000 +-0.000560   AG  F  RS356  I-1
0030     48 0.000000 +-0.000890   CD  F  RS356  I-1
0030     49 0.000000 +-0.000960   IN  F  RS356  I-1
0030     50 0.000000 +-0.001050   SN  F  RS356  I-1
0030     51 0.000000 +-0.002000   SB  F  RS356  I-1
0030     56 0.001850 +-0.005490   BA  F  RS356  I-1
0030     80 0.000000 +-0.000130   HG  F  RS356  I-1
0030     82 0.001430 +-0.000350   PB  F  RS356  I-1
0031     13 0.008400 +-0.002310   AL  F  RS358  I-2
0031     14 0.027360 +-0.005540   SI  F  RS358  I-2
0031     15 0.000620 +-0.000570   P   F  RS358  I-2
0031     16 0.029920 +-0.006780   S   F  RS358  I-2
0031     17 0.001170 +-0.000980   CL  F  RS358  I-2
0031     19 0.001170 +-0.001170   K   F  RS358  I-2
0031     20 0.012220 +-0.002470   CA  F  RS358  I-2
0031     22 0.000710 +-0.000230   TI  F  RS358  I-2
0031     23 0.000160 +-0.000110   V   F  RS358  I-2
0031     24 0.000000 +-0.000140   CR  F  RS358  I-2
0031     25 0.000790 +-0.000230   MN  F  RS358  I-2
0031     26 0.011550 +-0.002370   FE  F  RS358  I-2
0031     28 0.000010 +-0.000170   NI  F  RS358  I-2
0031     29 0.015370 +-0.003050   CU  F  RS358  I-2
0031     30 0.010490 +-0.002100   ZN  F  RS358  I-2
0031     33 0.007050 +-0.001660   AS  F  RS358  I-2
0031     34 0.000190 +-0.000130   SE  F  RS358  I-2
0031     35 0.000900 +-0.000260   BR  F  RS358  I-2
0031     38 0.000310 +-0.000250   SR  F  RS358  I-2
0031     46 0.000000 +-0.000800   PD  F  RS358  I-2
0031     47 0.000000 +-0.001120   AG  F  RS358  I-2
0031     48 0.002020 +-0.001800   CD  F  RS358  I-2
0031     49 0.000000 +-0.001740   IN  F  RS358  I-2
0031     50 0.002600 +-0.002130   SN  F  RS358  I-2
0031     51 0.000000 +-0.003770   SB  F  RS358  I-2
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0031    56 0.000000 +-0.010060   BA  F  RS358  I-2
0031    80 0.000050 +-0.000270   HG  F  RS358  I-2
0031    82 0.044420 +-0.008760   PB  F  RS358  I-2
0032    13 0.015340 +-0.005000   AL  F  RS360  I-3
0032    14 0.045430 +-0.013450   SI  F  RS360  I-3
0032    15 0.005520 +-0.001870   P   F  RS360  I-3
0032    16 0.120990 +-0.036490   S   F  RS360  I-3
0032    17 0.000000 +-0.001880   CL  F  RS360  I-3
0032    19 0.007160 +-0.002710   K   F  RS360  I-3
0032    20 0.129410 +-0.037630   CA  F  RS360  I-3
0032    22 0.001300 +-0.000470   TI  F  RS360  I-3
0032    23 0.000390 +-0.000200   V   F  RS360  I-3
0032    24 0.000120 +-0.000210   CR  F  RS360  I-3
0032    25 0.003010 +-0.000920   MN  F  RS360  I-3
0032    26 0.029510 +-0.008670   FE  F  RS360  I-3
0032    28 0.000020 +-0.000240   NI  F  RS360  I-3
0032    29 0.013940 +-0.004100   CU  F  RS360  I-3
0032    30 0.023920 +-0.006990   ZN  F  RS360  I-3
0032    33 0.007620 +-0.003100   AS  F  RS360  I-3
0032    34 0.000110 +-0.000210   SE  F  RS360  I-3
0032    35 0.001070 +-0.000420   BR  F  RS360  I-3
0032    38 0.001820 +-0.000650   SR  F  RS360  I-3
0032    46 0.000280 +-0.001180   PD  F  RS360  I-3
0032    47 0.000000 +-0.001590   AG  F  RS360  I-3
0032    48 0.003090 +-0.002700   CD  F  RS360  I-3
0032    49 0.000000 +-0.002530   IN  F  RS360  I-3
0032    50 0.000000 +-0.002850   SN  F  RS360  I-3
0032    51 0.000050 +-0.005450   SB  F  RS360  I-3
0032    56 0.000000 +-0.014580   BA  F  RS360  I-3
0032    80 0.000200 +-0.000470   HG  F  RS360  I-3
0032    82 0.181390 +-0.052700   PB  F  RS360  I-3
0033    13 0.011120 +-0.010870   AL  F  RS362  I-4
0033    14 0.007190 +-0.007110   SI  F  RS362  I-4
0033    15 0.001800 +-0.002810   P   F  RS362  I-4
0033    16 0.018410 +-0.017270   S   F  RS362  I-4
0033    17 0.010710 +-0.009610   CL  F  RS362  I-4
0033    19 0.000000 +-0.004870   K   F  RS362  I-4
0033    20 0.003040 +-0.002710   CA  F  RS362  I-4
0033    22 0.000360 +-0.000670   TI  F  RS362  I-4
0033    23 0.001190 +-0.001110   V   F  RS362  I-4
0033    24 0.000230 +-0.000650   CR  F  RS362  I-4
0033    25 0.000620 +-0.000810   MN  F  RS362  I-4
0033    26 0.005130 +-0.004650   FE  F  RS362  I-4
0033    28 0.000000 +-0.000690   NI  F  RS362  I-4
0033    29 0.000830 +-0.001040   CU  F  RS362  I-4
0033    30 0.008400 +-0.007080   ZN  F  RS362  I-4
0033    33 0.001130 +-0.002060   AS  F  RS362  I-4
0033    34 0.000880 +-0.000900   SE  F  RS362  I-4
0033    35 0.000820 +-0.000980   BR  F  RS362  I-4
0033    38 0.000000 +-0.001010   SR  F  RS362  I-4
0033    46 0.000000 +-0.003330   PD  F  RS362  I-4
0033    47 0.000000 +-0.004530   AG  F  RS362  I-4
0033    48 0.000000 +-0.007150   CD  F  RS362  I-4
0033    49 0.009690 +-0.011500   IN  F  RS362  I-4
0033    50 0.000000 +-0.008540   SN  F  RS362  I-4
0033    51 0.000000 +-0.015930   SB  F  RS362  I-4
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0033     56 0.000000 +-0.042720   BA   F   RS362   I-4
0033     80 0.000000 +-0.001020   HG   F   RS362   I-4
0033     82 0.019780 +-0.016730   PB   F   RS362   I-4
0034     13 0.021100 +-0.002110   AL   F   RS364   I-5
0034     14 0.064960 +-0.006496   SI   F   RS364   I-5
0034     15 0.001260 +-0.000400   P    F   RS364   I-5
0034     16 0.010230 +-0.001040   S    F   RS364   I-5
0034     17 0.004550 +-0.000480   CL   F   RS364   I-5
0034     19 0.001630 +-0.000420   K    F   RS364   I-5
0034     20 0.295150 +-0.029515   CA   F   RS364   I-5
0034     22 0.000810 +-0.000090   TI   F   RS364   I-5
0034     23 0.000080 +-0.000030   V    F   RS364   I-5
0034     24 0.000090 +-0.000040   CR   F   RS364   I-5
0034     25 0.000500 +-0.000060   MN   F   RS364   I-5
0034     26 0.010430 +-0.001043   FE   F   RS364   I-5
0034     28 0.000050 +-0.000050   NI   F   RS364   I-5
0034     29 0.000160 +-0.000050   CU   F   RS364   I-5
0034     30 0.001040 +-0.000104   ZN   F   RS364   I-5
0034     33 0.000200 +-0.000130   AS   F   RS364   I-5
0034     34 0.000060 +-0.000030   SE   F   RS364   I-5
0034     35 0.000270 +-0.000050   BR   F   RS364   I-5
0034     38 0.000240 +-0.000070   SR   F   RS364   I-5
0034     46 0.000000 +-0.000210   PD   F   RS364   I-5
0034     47 0.000000 +-0.000270   AG   F   RS364   I-5
0034     48 0.000420 +-0.000450   CD   F   RS364   I-5
0034     49 0.000000 +-0.000470   IN   F   RS364   I-5
0034     50 0.000090 +-0.000520   SN   F   RS364   I-5
0034     51 0.000000 +-0.000950   SB   F   RS364   I-5
0034     56 0.000000 +-0.002560   BA   F   RS364   I-5
0034     80 0.000000 +-0.000060   HG   F   RS364   I-5
0034     82 0.002700 +-0.000270   PB   F   RS364   I-5
0035     13 0.008270 +-0.000980   AL   F   RS366   I-7
0035     14 0.015390 +-0.001539   SI   F   RS366   I-7
0035     15 0.006800 +-0.000680   P    F   RS366   I-7
0035     16 0.146410 +-0.016150   S    F   RS366   I-7
0035     17 0.017920 +-0.001900   CL   F   RS366   I-7
0035     19 0.012100 +-0.001330   K    F   RS366   I-7
0035     20 0.003780 +-0.000378   CA   F   RS366   I-7
0035     22 0.000240 +-0.000060   TI   F   RS366   I-7
0035     23 0.000100 +-0.000030   V    F   RS366   I-7
0035     24 0.000250 +-0.000050   CR   F   RS366   I-7
0035     25 0.000250 +-0.000050   MN   F   RS366   I-7
0035     26 0.001720 +-0.000210   FE   F   RS366   I-7
0035     28 0.000550 +-0.000090   NI   F   RS366   I-7
0035     29 0.003880 +-0.000388   CU   F   RS366   I-7
0035     30 0.127920 +-0.012792   ZN   F   RS366   I-7
0035     33 0.032760 +-0.003276   AS   F   RS366   I-7
0035     34 0.000650 +-0.000120   SE   F   RS366   I-7
0035     35 0.003960 +-0.000396   BR   F   RS366   I-7
0035     38 0 000180 +-0.000100   SR   F   RS366   I-7
0035     46 0.000350 +-0 000250   PD   F   RS366   I-7
0035     47 0.000480 +-0.000350   AG   F   RS366   I-7
0035     48 0.105130 +-0 010513   CD   F   RS366   I-7
0035     49 0.000280 +-0.000540   IN   F   RS366   I-7
0035     50 0.002750 +-0.000670   SN   F   RS366   I-7
0035     51 0 001810 +-0.001330   SB   F   RS366   I-7
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0035     56 0.000000 +-0.002840   BA   F   RS366   I-7
0035     80 0.000320 +-0.000210   HG   F   RS366   I-7
0035     82 0.299720 +-0.029972   PB   F   RS366   I-7
0036     13 0.016870 +-0.001687   AL   F   RS370   I-8
0036     14 0.049250 +-0.004925   SI   F   RS370   I-8
0036     15 0.008780 +-0.000878   P    F   RS370   I-8
0036     16 0.183370 +-0.018337   S    F   RS370   I-8
0036     17 0.000000 +-0.001180   CL   F   RS370   I-8
0036     19 0.007870 +-0.000787   K    F   RS370   I-8
0036     20 0.044520 +-0.004452   CA   F   RS370   I-8
0036     22 0.000860 +-0.000190   TI   F   RS370   I-8
0036     23 0.000050 +-0.000070   V    F   RS370   I-8
0036     24 0.000500 +-0.000050   CR   F   RS370   I-8
0036     25 0.003420 +-0.000342   MN   F   RS370   I-8
0036     26 0.039490 +-0.003949   FE   F   RS370   I-8
0036     28 0.000660 +-0.000066   NI   F   RS370   I-8
0036     29 0.014630 +-0.001463   CU   F   RS370   I-8
0036     30 0.032850 +-0.003285   ZN   F   RS370   I-8
0036     33 0.037060 +-0.003706   AS   F   RS370   I-8
0036     34 0.001130 +-0.000113   SE   F   RS370   I-8
0036     35 0.004980 +-0.000498   BR   F   RS370   I-8
0036     38 0.001780 +-0.000178   SR   F   RS370   I-8
0036     46 0.001470 +-0.000147   PD   F   RS370   I-8
0036     47 0.003300 +-0.000330   AG   F   RS370   I-8
0036     48 0.012490 +-0.001249   CD   F   RS370   I-8
0036     49 0.000730 +-0.000140   IN   F   RS370   I-8
0036     50 0.003430 +-0.000343   SN   F   RS370   I-8
0036     51 0.027010 +-0.002701   SB   F   RS370   I-8
0036     56 0.003270 +-0.000690   BA   F   RS370   I-8
0036     80 0.001850 +-0.000200   HG   F   RS370   I-8
0036     82 0.386780 +-0.038678   PB   F   RS370   I-8
0037     13 0.005110 +-0.001030   AL   F   RS374   I-9
0037     14 0.011050 +-0.001390   SI   F   RS374   I-9
0037     15 0.000790 +-0.000300   P    F   RS374   I-9
0037     16 0.017920 +-0.002610   S    F   RS374   I-9
0037     17 0.002660 +-0.000650   CL   F   RS374   I-9
0037     19 0.002400 +-0.000420   K    F   RS374   I-9
0037     20 0.004140 +-0.000530   CA   F   RS374   I-9
0037     22 0.000190 +-0.000080   TI   F   RS374   I-9
0037     23 0.000130 +-0.000060   V    F   RS374   I-9
0037     24 0.000080 +-0.000070   CR   F   RS374   I-9
0037     25 0.000210 +-0.000080   MN   F   RS374   I-9
0037     26 0.003360 +-0.000490   FE   F   RS374   I-9
0037     28 0.000000 +-0.000080   NI   F   RS374   I-9
0037     29 0.001370 +-0.000200   CU   F   RS374   I-9
0037     30 0.007170 +-0.000820   ZN   F   RS374   I-9
0037     33 0.001690 +-0.000490   AS   F   RS374   I-9
0037     34 0.000030 +-0.000070   SE   F   RS374   I-9
0037     35 0.000930 +-0.000150   BR   F   RS374   I-9
0037     38 0.000060 +-0.000120   SR   F   RS374   I-9
0037     46 0.000320 +-0.000440   PD   F   RS374   I-9
0037     47 0.000040 +-0.000550   AG   F   RS374   I-9
0037     48 0.004870 +-0.001090   CD   F   RS374   I-9
0037     49 0.000010 +-0.000850   IN   F   RS374   I-9
0037     50 0.000170 +-0.001050   SN   F   RS374   I-9
0037     51 0.000000 +-0.001910   SB   F   RS374   I-9
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0037     56 0.000000 +-0.004950   BA   F   RS374   I-9
0037     80 0.000000 +-0.000140   HG   F   RS374   I-9
0037     82 0.021720 +-0.002430   PB   F   RS374   I-9
0038     13 0.001410 +-0.000960   AL   F   RS378   I-10
0038     14 0.001470 +-0.000620   SI   F   RS378   I-10
0038     15 0.001070 +-0.000390   P    F   RS378   I-10
0038     16 0.019930 +-0.003500   S    F   RS378   I-10
0038     17 0.006440 +-0.001170   CL   F   RS378   I-10
0038     19 0.004600 +-0.000690   K    F   RS378   I-10
0038     20 0.001390 +-0.000280   CA   F   RS378   I-10
0038     22 0.000200 +-0.000120   TI   F   RS378   I-10
0038     23 0.000200 +-0.000080   V    F   RS378   I-10
0038     24 0.000230 +-0.000100   CR   F   RS378   I-10
0038     25 0.000040 +-0.000090   MN   F   RS378   I-10
0038     26 0.001080 +-0.000320   FE   F   RS378   I-10
0038     28 0.000840 +-0.000180   NI   F   RS378   I-10
0038     29 0.002650 +-0.000390   CU   F   RS378   I-10
0038     30 0.544760 +-0.067700   ZN   F   RS378   I-10
0038     33 0.005590 +-0.000960   AS   F   RS378   I-10
0038     34 0.000200 +-0.000090   SE   F   RS378   I-10
0038     35 0.000660 +-0.000140   BR   F   RS378   I-10
0038     38 0.000000 +-0.000150   SR   F   RS378   I-10
0038     46 0.000000 +-0.000470   PD   F   RS378   I-10
0038     47 0.000000 +-0.000690   AG   F   RS378   I-10
0038     48 0.000000 +-0.000990   CD   F   RS378   I-10
0038     49 0.000270 +-0.001130   IN   F   RS378   I-10
0038     50 0.005270 +-0.001480   SN   F   RS378   I-10
0038     51 0.002380 +-0.002320   SB   F   RS378   I-10
0038     56 0.000000 +-0.006070   BA   F   RS378   I-10
0038     80 0.000690 +-0.000240   HG   F   RS378   I-10
0038     82 0.077350 +-0.004720   PB   F   RS378   I-10
0039     13 0.015850 +-0.001630   AL   F   RS376   I-11
0039     14 0.039450 +-0.003530   SI   F   RS376   I-11
0039     15 0.024750 +-0.002200   P    F   RS376   I-11
0039     16 0.011390 +-0.001500   S    F   RS376   I-11
0039     17 0.002770 +-0.000510   CL   F   RS376   I-11
0039     19 0.004190 +-0.000460   K    F   RS376   I-11
0039     20 0.032910 +-0.002900   CA   F   RS376   I-11
0039     22 0.002850 +-0.000290   TI   F   RS376   I-11
0039     23 0.000290 +-0.000070   V    F   RS376   I-11
0039     24 0.000630 +-0.000090   CR   F   RS376   I-11
0039     25 0.000610 +-0.000090   MN   F   RS376   I-11
0039     26 0.017680 +-0.001600   FE   F   RS376   I-11
0039     28 0.002820 +-0.000300   NI   F   RS376   I-11
0039     29 0.570150 +-0.049160   CU   F   RS376   I-11
0039     30 0.013830 +-0.001330   ZN   F   RS376   I-11
0039     33 0.000690 +-0.000280   AS   F   RS376   I-11
0039     34 0.000030 +-0.000050   SE   F   RS376   I-11
0039     35 0.000480 +-0.000080   BR   F   RS376   I-11
0039     38 0.000160 +-0.000100   SR   F   RS376   I-11
0039     46 0.000000 +-0.000300   PD   F   RS376   I-11
0039     47 0.000220 +-0.000430   AG   F   RS376   I-11
0039     48 0.001820 +-0.000680   CD   F   RS376   I-11
0039     49 0.000640 +-0.000670   IN   F   RS376   I-11
0039     50 0.000780 +-0.000830   SN   F   RS376   I-11
0039     51 0.000000 +-0.001490   SB   F   RS376   I-11
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0039      56 0.000000 +-0.003830   BA  F  RS376  I-11
0039      80 0.000080 +-0.000110   HG  F  RS376  I-11
0039      82 0.009890 +-0.000930   PB  F  RS376  I-11
0040      13 0.001560 +-0.000790   AL  F  RS380  I-12
0040      14 0.003800 +-0.000630   SI  F  RS380  I-12
0040      15 0.001540 +-0.000340   P   F  RS380  I-12
0040      16 0.028560 +-0.004220   S   F  RS380  I-12
0040      17 0.001520 +-0.000670   CL  F  RS380  I-12
0040      19 0.005060 +-0.000630   K   F  RS380  I-12
0040      20 0.001540 +-0.000250   CA  F  RS380  I-12
0040      22 0.000310 +-0.000090   TI  F  RS380  I-12
0040      23 0.000190 +-0.000060   V   F  RS380  I-12
0040      24 0.000120 +-0.000070   CR  F  RS380  I-12
0040      25 0.000110 +-0.000070   MN  F  RS380  I-12
0040      26 0.000740 +-0.000270   FE  F  RS380  I-12
0040      28 0.001300 +-0.000200   NI  F  RS380  I-12
0040      29 0.002480 +-0.000310   CU  F  RS380  I-12
0040      30 0.648530 +-0.067840   ZN  F  RS380  I-12
0040      33 0.006950 +-0.001010   AS  F  RS380  I-12
0040      34 0.000250 +-0.000080   SE  F  RS380  I-12
0040      35 0.000860 +-0.000140   BR  F  RS380  I-12
0040      38 0.000000 +-0.000110   SR  F  RS380  I-12
0040      46 0.000310 +-0.000390   PD  F  RS380  I-12
0040      47 0.000620 +-0.000530   AG  F  RS380  I-12
0040      48 0.002170 +-0.000820   CD  F  RS380  I-12
0040      49 0.000390 +-0.000830   IN  F  RS380  I-12
0040      50 0.002920 +-0.001090   SN  F  RS380  I-12
0040      51 0.006760 +-0.001930   SB  F  RS380  I-12
0040      56 0.004140 +-0.004640   BA  F  RS380  I-12
0040      80 0.000870 +-0.000220   HG  F  RS380  I-12
0040      82 0.056060 +-0.005930   PB  F  RS380  I-12
0041      13 0.040390 +-0.005190   AL  F  RS382  I-14
0041      14 0.081310 +-0.010050   SI  F  RS382  I-14
0041      15 0.001370 +-0.000410   P   F  RS382  I-14
0041      16 0.003810 +-0.001320   S   F  RS382  I-14
0041      17 0.001640 +-0.000550   CL  F  RS382  I-14
0041      19 0.002170 +-0.000380   K   F  RS382  I-14
0041      20 0.027380 +-0.003420   CA  F  RS382  I-14
0041      22 0.002360 +-0.000340   TI  F  RS382  I-14
0041      23 0.000220 +-0.000090   V   F  RS382  I-14
0041      24 0.000160 +-0.000090   CR  F  RS382  I-14
0041      25 0.000000 +-0.000090   MN  F  RS382  I-14
0041      26 0.014640 +-0.001890   FE  F  RS382  I-14
0041      28 0.000060 +-0.000090   NI  F  RS382  I-14
0041      29 0.005160 +-0.000680   CU  F  RS382  I-14
0041      30 0.003990 +-0.000540   ZN  F  RS382  I-14
0041      33 0.000410 +-0.000260   AS  F  RS382  I-14
0041      34 0.000040 +-0.000070   SE  F  RS382  I-14
0041      35 0.000140 +-0.000100   BR  F  RS382  I-14
0041      38 0.000120 +-0.000140   SR  F  RS382  I-14
0041      46 0.000000 +-0.000460   PD  F  RS382  I-14
0041      47 0.000000 +-0.000620   AG  F  RS382  I-14
0041      48 0.000500 +-0.000890   CD  F  RS382  I-14
0041      49 0.000000 +-0.001010   IN  F  RS382  I-14
0041      50 0.000000 +-0.001190   SN  F  RS382  I-14
0041      51 0.002250 +-0.002030   SB  F  RS382  I-14
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0041     56 0.005600 +-0.006100   BA  F   RS382   I-14
0041     80 0.000170 +-0.000160   HG  F   RS382   I-14
0041     82 0.002490 +-0.000490   PB  F   RS382   I-14
0042     13 0.009560 +-0.000956   AL  F   RS384   I-15
0042     14 0.019840 +-0.001984   SI  F   RS384   I-15
0042     15 0.003970 +-0.000397   P   F   RS384   I-15
0042     16 0.044680 +-0.004468   S   F   RS384   I-15
0042     17 0.000130 +-0.000220   CL  F   RS384   I-15
0042     19 0.001010 +-0.000120   K   F   RS384   I-15
0042     20 0.006560 +-0.000656   CA  F   RS384   I-15
0042     22 0.000340 +-0.000040   TI  F   RS384   I-15
0042     23 0.000470 +-0.000047   V   F   RS384   I-15
0042     24 0.000240 +-0.000030   CR  F   RS384   I-15
0042     25 0.000130 +-0.000030   MN  F   RS384   I-15
0042     26 0.008140 +-0.000814   FE  F   RS384   I-15
0042     28 0.000220 +-0.000040   NI  F   RS384   I-15
0042     29 0.001230 +-0.000123   CU  F   RS384   I-15
0042     30 0.004160 +-0.000416   ZN  F   RS384   I-15
0042     33 0.001030 +-0.000160   AS  F   RS384   I-15
0042     34 0.000030 +-0.000020   SE  F   RS384   I-15
0042     35 0.000070 +-0.000030   BR  F   RS384   I-15
0042     38 0.000110 +-0.000040   SR  F   RS384   I-15
0042     46 0.000010 +-0.000120   PD  F   RS384   I-15
0042     47 0.000030 +-0.000160   AG  F   RS384   I-15
0042     48 0.001150 +-0.000270   CD  F   RS384   I-15
0042     49 0.000000 +-0.000250   IN  F   RS384   I-15
0042     50 0.000100 +-0.000310   SN  F   RS384   I-15
0042     51 0.001320 +-0.000540   SB  F   RS384   I-15
0042     56 0.000000 +-0.001480   BA  F   RS384   I-15
0042     80 0.000020 +-0.000040   HG  F   RS384   I-15
0042     82 0.007690 +-0.000769   PB  F   RS384   I-15
0043     13 0.049440 +-0.005830   AL  F   RS388   I-16
0043     14 0.100260 +-0.011440   SI  F   RS388   I-16
0043     15 0.001820 +-0.000420   P   F   RS388   I-16
0043     16 0.007040 +-0.001510   S   F   RS388   I-16
0043     17 0.000640 +-0.000460   CL  F   RS388   I-16
0043     19 0.003750 +-0.000540   K   F   RS388   I-16
0043     20 0.027910 +-0.003230   CA  F   RS388   I-16
0043     22 0.002280 +-0.000310   TI  F   RS388   I-16
0043     23 0.000280 +-0.000090   V   F   RS388   I-16
0043     24 0.000300 +-0.000100   CR  F   RS388   I-16
0043     25 0.000110 +-0.000090   MN  F   RS388   I-16
0043     26 0.016150 +-0.001920   FE  F   RS388   I-16
0043     28 0.000000 +-0.000090   NI  F   RS388   I-16
0043     29 0.002820 +-0.000370   CU  F   RS388   I-16
0043     30 0.000480 +-0.000150   ZN  F   RS388   I-16
0043     33 0.000620 +-0.000270   AS  F   RS388   I-16
0043     34 0.000040 +-0.000070   SE  F   RS388   I-16
0043     35 0.000010 +-0.000090   BR  F   RS388   I-16
0043     38 0.000070 +-0.000140   SR  F   RS388   I-16
0043     46 0.000000 +-0.000440   PD  F   RS388   I-16
0043     47 0.000000 +-0.000580   AG  F   RS388   I-16
0043     48 0.000850 +-0.000880   CD  F   RS388   I-16
0043     49 0.001200 +-0.001030   IN  F   RS388   I-16
0043     50 0.000280 +-0.001180   SN  F   RS388   I-16
0043     51 0.001810 +-0.001930   SB  F   RS388   I-16
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0043      56 0.000000 +-0.005710   BA   F   RS388   I-16
0043      80 0 000000 +-0.000130   HG   F   RS388   I-16
0043      82 0.003630 +-0.000560   PB   F   RS388   I-16
0044      13 0.108650 +-0.010865   AL   F   RS567    I-17
0044      14 0.224660 +-0.022466   SI   F   RS567    I-17
0044      15 0.001940 +-0.000194   P    F   RS567    I-17
0044      16 0.005660 +-0.000566   S    F   RS567    I-17
0044      17 0.001710 +-0.000200   CL   F   RS567    I-17
0044      19 0.009680 +-0.000968   K    F   RS567    I-17
0044      20 0.031420 +-0.003142   CA   F   RS567    I-17
0044      22 0.002830 +-0.000283   TI   F   RS567    I-17
0044      23 0.000080 +-0.000030   V    F   RS567    I-17
0044      24 0 000150 +-0 000030   CR   F   RS567    I-17
0044      25 0.000130 +-0.000030   MN   F   RS567    I-17
0044      26 0.014220 +-0.001422   FE   F   RS567    I-17
0044      28 0.000080 +-0.000020   NI   F   RS567    I-17
0044      29 0.000220 +-0.000040   CU   F   RS567    I-17
0044      30 0.000330 +-0.000040   ZN   F   RS567    I-17
0044      33 0.000020 +-0.000060   AS   F   RS567    I-17
0044      34 0.000000 +-0.000020   SE   F   RS567    I-17
0044      35 0.000060 +-0.000020   BR   F   RS567    I-17
0044      38 0.000150 +-0.000040   SR   F   RS567    I-17
0044      46 0.000100 +-0.000110   PD   F   RS567    I-17
0044      47 0.000000 +-0.000140   AG   F   RS567    I-17
0044      48 0.000000 +-0.000210   CD   F   RS567    I-17
0044      49 0.000310 +-0.000240   IN   F   RS567    I-17
0044      50 0.000270 +-0.000280   SN   F   RS567    I-17
0044      51 0.000000 +-0.000540   SB   F   RS567    I-17
0044      56 0.000770 +-0.001380   BA   F   RS567    I-17
0044      80 0.000000 +-0.000030   HG   F   RS567    I-17
0044      82 0.000720 +-0.000100   PB   F   RS567    I-17
0045      13 0.115690 +-0.011569   AL   F   RS568    I-18
0045      14 0.275080 +-0.027508   SI   F   RS568    I-18
0045      15 0.002450 +-0.000245   P    F   RS568    I-18
0045      16 0.011630 +-0.001163   S    F   RS568    I-18
0045      17 0.000670 +-0.000110   CL   F   RS568    I-18
0045      19 0.014500 +-0.001450   K    F   RS568    I-18
0045      20 0.002840 +-0.000284   CA   F   RS568    I-18
0045      22 0.003210 +-0.000321   TI   F   RS568    I-18
0045      23 0.000320 +-0.000032   V    F   RS568    I-18
0045      24 0.000180 +-0.000020   CR   F   RS568    I-18
0045      25 0.000160 +-0.000020   MN   F   RS568    I-18
0045      26 0.026970 +-0.002697   FE   F   RS568    I-18
0045      28 0.000060 +-0.000020   NI   F   RS568    I-18
0045      29 0.000180 +-0.000020   CU   F   RS568    I-18
0045      30 0.000300 +-0.000030   ZN   F   RS568    I-18
0045      33 0.000050 +-0.000040   AS   F   RS568    I-18
0045      34 0.000000 +-0.000010   SE   F   RS568    I-18
0045      35 0.000030 +-0.000010   BR   F   RS568    I-18
0045      38 0.000530 +-0.000053   SR   F   RS568    I-18
0045      46 0.000000 +-0.000060   PD   F   RS568    I-18
0045      47 0.000000 +-0.000090   AG   F   RS568    I-18
0045      48 0 000000 +-0.000130   CD   F   RS568    I-18
0045      49 0.000000 +-0.000140   IN   F   RS568    I-18
0045      50 0.000000 +-0.000160   SN   F   RS568    I-18
0045      51 0.000000 +-0.000320   SB   F   RS568    I-18
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0045     56 0.001170 +-0.000840   BA  F  RS568   I-18
0045     80 0.000030 +-0.000020   HG  F  RS568   I-18
0045     82 0.000610 +-0.000070   PB  F  RS568   I-18
0046     13 0.125250 +-0.012525   AL  F  RS569   I-19
0046     14 0.303130 +-0.030318   SI  F  RS569   I-19
0046     15 0.002800 +-0.000280   P   F  RS569   I-19
0046     16 0.015800 +-0.001580   S   F  RS569   I-19
0046     17 0.000950 +-0.000150   CL  F  RS569   I-19
0046     19 0.012720 +-0.001272   K   F  RS569   I-19
0046     20 0.014090 +-0.001409   CA  F  RS569   I-19
0046     22 0.005260 +-0.000526   TI  F  RS569   I-19
0046     23 0.000350 +-0.000040   V   F  RS569   I-19
0046     24 0.000300 +-0.000030   CR  F  RS569   I-19
0046     25 0.001170 +-0.000117   MN  F  RS569   I-19
0046     26 0.052490 +-0.005249   FE  F  RS569   I-19
0046     28 0.000260 +-0.000030   NI  F  RS569   I-19
0046     29 0.001980 +-0.000198   CU  F  RS569   I-19
0046     30 0.022240 +-0.002224   ZN  F  RS569   I-19
0046     33 0.001330 +-0.000140   AS  F  RS569   I-19
0046     34 0.000010 +-0.000010   SE  F  RS569   I-19
0046     35 0.000150 +-0.000020   BR  F  RS569   I-19
0046     38 0.001030 +-0.000103   SR  F  RS569   I-19
0046     46 0.000100 +-0.000070   PD  F  RS569   I-19
0046     47 0.000240 +-0.000100   AG  F  RS569   I-19
0046     48 0.000340 +-0.000140   CD  F  RS569   I-19
0046     49 0.000000 +-0.000140   IN  F  RS569   I-19
0046     50 0.000150 +-0.000170   SN  F  RS569   I-19
0046     51 0.000000 +-0.000330   SB  F  RS569   I-19
0046     56 0.000000 +-0.000820   BA  F  RS569   I-19
0046     80 0.000050 +-0.000030   HG  F  RS569   I-19
0046     82 0.012190 +-0.001219   PB  F  RS569   I-19
0047     13 0.134530 +-0.013453   AL  F  RS412  I-20
0047     14 0.334030 +-0.033403   SI  F  RS412  I-20
0047     15 0.003930 +-0.000393   P   F  RS412  I-20
0047     16 0.009770 +-0.001050   S   F  RS412  I-20
0047     17 0.083750 +-0.008375   CL  F  RS412  I-20
0047     19 0.014250 +-0.001425   K   F  RS412  I-20
0047     20 0.037350 +-0.003735   CA  F  RS412  I-20
0047     22 0.003850 +-0.000385   TI  F  RS412  I-20
0047     23 0.000300 +-0.000060   V   F  RS412  I-20
0047     24 0.000370 +-0.000060   CR  F  RS412  I-20
0047     25 0.001220 +-0.000122   MN  F  RS412  I-20
0047     26 0.049700 +-0.004970   FE  F  RS412  I-20
0047     28 0.000200 +-0.000060   NI  F  RS412  I-20
0047     29 0.002920 +-0.000292   CU  F  RS412  I-20
0047     30 0.002530 +-0.000253   ZN  F  RS412  I-20
0047     33 0.000060 +-0.000140   AS  F  RS412  I-20
0047     34 0.000020 +-0.000030   SE  F  RS412  I-20
0047     35 0.000160 +-0.000050   BR  F  RS412  I-20
0047     38 0.000270 +-0.000070   SR  F  RS412  I-20
0047     46 0.000360 +-0.000230   PD  F  RS412  I-20
0047     47 0.000570 +-0.000310   AG  F  RS412  I-20
0047     48 0.000000 +-0.000440   CD  F  RS412  I-20
0047     49 0.000000 +-0.000520   IN  F  RS412  I-20
0047     50 0.000320 +-0.000580   SN  F  RS412  I-20
0047     51 0.000000 +-0.001070   SB  F  RS412  I-20
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0047     56 0.000000 +-0.002850   BA   F   RS412   I-20
0047     80 0.000000 +-0.000070   HG   F   RS412   I-20
0047     82 0.002530 +-0.000270   PB   F   RS412   I-20
0048     13 0.039790 +-0.003979   AL   F   RS404   II-2
0048     14 0.090650 +-0.009065   SI   F   RS404   II-2
0048     15 0.003700 +-0.000370   P    F   RS404   II-2
0048     16 0.052120 +-0.005212   S    F   RS404   II-2
0048     17 0.000980 +-0.000450   CL   F   RS404   II-2
0048     19 0.009790 +-0.000979   K    F   RS404   II-2
0048     20 0.010570 +-0.001057   CA   F   RS404   II-2
0048     22 0.003030 +-0.000303   TI   F   RS404   II-2
0048     23 0.000630 +-0.000063   V    F   RS404   II-2
0048     24 0.001030 +-0.000103   CR   F   RS404   II-2
0048     25 0.003560 +-0.000356   MN   F   RS404   II-2
0048     26 0.275760 +-0.027576   FE   F   RS404   II-2
0048     28 0.000750 +-0.000075   NI   F   RS404   II-2
0048     29 0.012530 +-0.001253   CU   F   RS404   II-2
0048     30 0.156000 +-0.015600   ZN   F   RS404   II-2
0048     33 0.008730 +-0.000873   AS   F   RS404   II-2
0048     34 0.000320 +-0.000050   SE   F   RS404   II-2
0048     35 0.000770 +-0.000077   BR   F   RS404   II-2
0048     38 0.000740 +-0.000074   SR   F   RS404   II-2
0048     46 0.000100 +-0.000130   PD   F   RS404   II-2
0048     47 0.000920 +-0.000200   AG   F   RS404   II-2
0048     48 0.003410 +-0.000390   CD   F   RS404   II-2
0048     49 0.000550 +-0.000270   IN   F   RS404   II-2
0048     50 0.002040 +-0.000380   SN   F   RS404   II-2
0048     51 0.004450 +-0.000750   SB   F   RS404   II-2
0048     56 0.000000 +-0.001500   BA   F   RS404   II-2
0048     80 0.000400 +-0.000090   HG   F   RS404   II-2
0048     82 0.085090 +-0.008509   PB   F   RS404   II-2
0049     13 0.012240 +-0.001780   AL   F   RS406   II-3
0049     14 0.034010 +-0.003990   SI   F   RS406   II-3
0049     15 0.001780 +-0.000410   P    F   RS406   II-3
0049     16 0.017470 +-0.002670   S    F   RS406   II-3
0049     17 0.003030 +-0.000730   CL   F   RS406   II-3
0049     19 0.005470 +-0.000730   K    F   RS406   II-3
0049     20 0.002930 +-0.001090   CA   F   RS406   II-3
0049     22 0.001120 +-0.000180   TI   F   RS406   II-3
0049     23 0.000750 +-0.000130   V    F   RS406   II-3
0049     24 0.006670 +-0.000130   CR   F   RS406   II-3
0049     25 0.001230 +-0.000180   MN   F   RS406   II-3
0049     26 0.062230 +-0.007110   FE   F   RS406   II-3
0049     28 0.001270 +-0.000220   NI   F   RS406   II-3
0049     29 0.298010 +-0.033670   CU   F   RS406   II-3
0049     30 0.036770 +-0.004200   ZN   F   RS406   II-3
0049     33 0.002060 +-0.000510   AS   F   RS406   II-3
0049     34 0.000000 +-0.000070   SE   F   RS406   II-3
0049     35 0.000820 +-0.000150   BR   F   RS406   II-3
0049     38 0.006190 +-0.000140   SR   F   RS406   II-3
0049     46 0.000000 +-0.000470   PD   F   RS406   II-3
0049     47 0.000040 +-0.000650   AG   F   RS406   II-3
0049     48 0.000000 +-0.000900   CD   F   RS406   II-3
0049     49 0.000000 +-0.000970   IN   F   RS406   II-3
0049     50 0.000000 +-0.001190   SN   F   RS406   II-3
0049     51 0.000000 +-0.002200   SB   F   RS406   II-3
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0049     56 0.000000 +-0.005880   BA   F   RS406   II-3
0049     80 0.000090 +-0.000170   HG   F   RS406   II-3
0049     82 0.019200 +-0.002250   PB   F   RS406   II-3
0050     13 0.019360 +-0.001936   AL   T   RL044   III-1
0050     14 0.033830 +-0.003383   SI   T   RL044   III-1
0050     15 0.001620 +-0.000162   P    T   RL044   III-1
0050     16 0.010410 +-0.001041   S    T   RL044   III-1
0050     17 0.000150 +-0.000110   CL   T   RL044   III-1
0050     19 0.001300 +-0.000130   K    T   RL044   III-1
0050     20 0.004310 +-0.000431   CA   T   RL044   III-1
0050     22 0.000780 +-0.000078   TI   T   RL044   III-1
0050     23 0.000090 +-0.000020   V    T   RL044   III-1
0050     24 0.000130 +-0.000020   CR   T   RL044   III-1
0050     25 0.000280 +-0.000028   MN   T   RL044   III-1
0050     26 0.025630 +-0.002563   FE   T   RL044   III-1
0050     28 0.000080 +-0.000020   NI   T   RL044   III-1
0050     29 0.007080 +-0.000708   CU   T   RL044   III-1
0050     30 0.004370 +-0.000437   ZN   T   RL044   III-1
0050     33 0.003890 +-0.000389   AS   T   RL044   III-1
0050     34 0.000030 +-0.000010   SE   T   RL044   III-1
0050     35 0.000320 +-0.000032   BR   T   RL044   III-1
0050     38 0.000120 +-0.000020   SR   T   RL044   III-1
0050     46 0.000000 +-0.000060   PD   T   RL044   III-1
0050     47 0.000000 +-0.000090   AG   T   RL044   III-1
0050     48 0.000350 +-0.000130   CD   T   RL044   III-1
0050     49 0.000130 +-0.000140   IN   T   RL044   III-1
0050     50 0.000400 +-0.000160   SN   T   RL044   III-1
0050     51 0.002870 +-0.000420   SB   T   RL044   III-1
0050     56 0.000000 +-0.000760   BA   T   RL044   III-1
0050     80 0.000030 +-0.000030   HG   T   RL044   III-1
0050     82 0.008690 +-0.000869   PB   T   RL044   III-1
0051     13 0.007350 +-0.000735   AL   T   RL040   III-3
0051     14 0.026130 +-0.002613   SI   T   RL040   III-3
0051     15 0.002330 +-0.000233   P    T   RL040   III-3
0051     16 0.037160 +-0.007340   S    T   RL040   III-3
0051     17 0.000000 +-0.000480   CL   T   RL040   III-3
0051     19 0.000740 +-0.000074   K    T   RL040   III-3
0051     20 0.012890 +-0.001289   CA   T   RL040   III-3
0051     22 0.000770 +-0.000077   TI   T   RL040   III-3
0051     23 0.000110 +-0.000011   V    T   RL040   III-3
0051     24 0.000220 +-0.000022   CR   T   RL040   III-3
0051     25 0.000360 +-0.000036   MN   T   RL040   III-3
0051     26 0.023660 +-0.002366   FE   T   RL040   III-3
0051     28 0.007550 +-0.000755   NI   T   RL040   III-3
0051     29 0.379190 +-0.037919   CU   T   RL040   III-3
0051     30 0.011090 +-0.001109   ZN   T   RL040   III-3
0051     33 0.064600 +-0.006460   AS   T   RL040   III-3
0051     34 0.000400 +-0.000050   SE   T   RL040   III-3
0051     35 0.005960 +-0.000596   BR   T   RL040   III-3
0051     38 0.000110 +-0.000040   SR   T   RL040   III-3
0051     46 0.002060 +-0.000206   PD   T   RL040   III-3
0051     47 0.005260 +-0.000526   AG   T   RL040   III-3
0051     48 0.003390 +-0.000339   CD   T   RL040   III-3
0051     49 0.000920 +-0.000092   IN   T   RL040   III-3
0051     50 0.006490 +-0.000649   SN   T   RL040   III-3
0051     51 0.036410 +-0.003641   SB   T   RL040   III-3
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0051     56 0.000380 +-0.000250   BA  T  RL040   III-3
0051     80 0.000240 +-0.000070   HG  T  RL040   III-3
0051     82 0.178800 +-0.017880   PB  T  RL040   III-3
0052     13 0.055690 +-0.005569   AL  F  RS396   IV-1
0052     14 0.176280 +-0.017628   SI  F  RS396   IV-1
0052     15 0.004130 +-0.000420   P   F  RS396   IV-1
0052     16 0.055390 +-0.006150   S   F  RS396   IV-1
0052     17 0.000000 +-0.000640   CL  F  RS396   IV-1
0052     19 0.008470 +-0.000847   K   F  RS396   IV-1
0052     20 0.040850 +-0.004085   CA  F  RS396   IV-1
0052     22 0.002680 +-0.000268   TI  F  RS396   IV-1
0052     23 0.000450 +-0.000070   V   F  RS396   IV-1
0052     24 0.000700 +-0.000090   CR  F  RS396   IV-1
0052     25 0.003940 +-0.000394   MN  F  RS396   IV-1
0052     26 0.115990 +-0.011599   FE  F  RS396   IV-1
0052     28 0.000520 +-0.000090   NI  F  RS396   IV-1
0052     29 0.037790 +-0.003779   CU  F  RS396   IV-1
0052     30 0.102730 +-0.010273   ZN  F  RS396   IV-1
0052     33 0.010810 +-0.001120   AS  F  RS396   IV-1
0052     34 0.000300 +-0.000070   SE  F  RS396   IV-1
0052     35 0.001090 +-0.000120   BR  F  RS396   IV-1
0052     38 0.000480 +-0.000090   SR  F  RS396   IV-1
0052     46 0.000000 +-0.000250   PD  F  RS396   IV-1
0052     47 0.001090 +-0.000380   AG  F  RS396   IV-1
0052     48 0.002350 +-0.000610   CD  F  RS396   IV-1
0052     49 0.001400 +-0.000600   IN  F  RS396   IV-1
0052     50 0.001420 +-0.000710   SN  F  RS396   IV-1
0052     51 0.003810 +-0.001360   SB  F  RS396   IV-1
0052     56 0.003530 +-0.003320   BA  F  RS396   IV-1
0052     80 0.000550 +-0.000160   HG  F  RS396   IV-1
0052     82 0.099840 +-0.009984   PB  F  RS396   IV-1
0053     13 0.050670 +-0.005067   AL  F  RS398   IV-2
0053     14 0.171720 +-0.017172   SI  F  RS398   IV-2
0053     15 0.002960 +-0.000296   P   F  RS398   IV-2
0053     16 0.032700 +-0.003270   S   F  RS398   IV-2
0053     17 0.001520 +-0.000380   CL  F  RS398   IV-2
0053     19 0.008610 +-0 000861   K   F  RS398   IV-2
0053     20 0.042040 +-0.004204   CA  F  RS398   IV-2
0053     22 0.003000 +-0.000300   TI  F  RS398   IV-2
0053     23 0.000530 +-0.000060   V   F  RS398   IV-2
0053     24 0.000830 +-0.000083   CR  F  RS398   IV-2
0053     25 0.004500 +-0.000450   MN  F  RS398   IV-2
0053     26 0.154610 +-0.015461   FE  F  RS398   IV-2
0053     28 0.000710 +-0.000071   NI  F  RS398   IV-2
0053     29 0.022220 +-0.002222   CU  F  RS398   IV-2
0053     30 0.144380 +-0.014438   ZN  F  RS398   IV-2
0053     33 0.015340 +-0.001534   AS  F  RS398   IV-2
0053     34 0.000180 +-0.000040   SE  F  RS398   IV-2
0053     35 0.001370 +-0.000137   BR  F  RS398   IV-2
0053     38 0.000530 +-0.000060   SR  F  RS398   IV-2
0053   . 46 0.000330 +-0.000160   PD  F  RS398   IV-2
0053     47 0.000730 +-0.000210   AG  F  RS398   IV-2
0053     48 0.001800 +-0.000350   CD  F  RS398   IV-2
0053     49 0.000330 +-0.000310   IN  F  RS398   IV-2
0053     50 0.001380 +-0.000400   SN  F  RS398   IV-2
0053     51 0.001720 +-0.000710   SB  F  RS398   IV-2
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0053      56 0.001500 +-0.001780   BA   F   RS398   IV-2
0053      80 0.000300 +-0.000080   HG   F   RS398   IV-2
0053      82 0.053620 +-0.005362   PB   F   RS398   IV-2
0054      13 0.048750 +-0.004875   AL   F   RS400   IV-3
0054      14 0.177080 +-0.017708   SI   F   RS400   IV-3
0054      15 0.004030 +-0.000450   P    F   RS400   IV-3
0054      16 0.051160 +-0.006410   S    F   RS400   IV-3
0054      17 0.000400 +-0.000710   CL   F   RS400   IV-3
0054      19 0.006290 +-0.000630   K    F   RS400   IV-3
0054      20 0.044050 +-0.004405   CA   F   RS400   IV-3
0054      22 0.002840 +-0.000284   TI   F   RS400   IV-3
0054      23 0.000590 +-0.000090   V    F   RS400   IV-3
0054      24 0.000880 +-0.000120   CR   F   RS400   IV-3
0054      25 0.006940 +-0.000694   MN   F   RS400   IV-3
0054      26 0.117880 +-0.011788   FE   F   RS400   IV-3
0054      28 0.000540 +-0.000100   NI   F   RS400   IV-3
0054      29 0.017000 +-0.001700   CU   F   RS400   IV-3
0054      30 0.111090 +-0.011109   ZN   F   RS400   IV-3
0054      33 0.009000 +-0.001130   AS   F   RS400   IV-3
0054      34 0.000290 +-0.000080   SE   F   RS400   IV-3
0054      35 0.000970 +-0.000130   BR   F   RS400   IV-3
0054      38 0.000440 +-0.000110   SR   F   RS400   IV-3
0054      46 0.000040 +-0.000300   PD   F   RS400   IV-3
0054      47 0.000910 +-0.000430   AG   F   RS400   IV-3
0054      48 0.002790 +-0.000720   CD   F   RS400   IV-3
0054      49 0.001380 +-0.000690   IN   F   RS400   IV-3
0054      50 0.000890 +-0.000800   SN   F   RS400   IV-3
0054      51 0.002050 +-0.001490   SB   F   RS400   IV-3
0054      56 0.000000 +-0.003760   BA   F   RS400   IV-3
0054      80 0.000730 +-0.000190   HG   F   RS400   IV-3
0054      82 0.107180 +-0.010718   PB   F   RS400   IV-3
0055      13 0.037440 +-0.003744   AL   F   RS402   IV-4
0055      14 0.182020 +-0.018202   SI   F   RS402   IV-4
0055      15 0.003520 +-0.000352   P    F   RS402   IV-4
0055      16 0.042600 +-0.004260   S    F   RS402   IV-4
0055      17 0.002290 +-0.000520   CL   F   RS402   IV-4
0055      19 0.007770 +-0.000777   K    F   RS402   IV-4
0055      20 0.093130 +-0.009313   CA   F   RS402   IV-4
0055      22 0.003720 +-0.000372   TI   F   RS402   IV-4
0055      23 0.000920 +-0.000100   V    F   RS402   IV-4
0055      24 0.000960 +-0.000100   CR   F   RS402   IV-4
0055      25 0.011680 +-0.001168   MN   F   RS402   IV-4
0055      26 0.162920 +-0.016292   FE   F   RS402   IV-4
0055      28 0.000540 +-0.000080   NI   F   RS402   IV-4
0055      29 0.017660 +-0.001766   CU   F   RS402   IV-4
0055      30 0.113050 +-0.011305   ZN   F   RS402   IV-4
0055      33 0.006340 +-0.000680   AS   F   RS402   IV-4
0055      34 0.000050 +-0.000050   SE   F   RS402   IV-4
0055      35 0.000650 +-0.000080   BR   F   RS402   IV-4
0055      38 0.001820 +-0.000182   SR   F   RS402   IV-4
0055      46 0.000000 +-0.000200   PD   F   RS402   IV-4
0055      47 0.000330 +-0.000280   AG   F   RS402   IV-4
0055      48 0.000500 +-0.000430   CD   F   RS402   IV-4
0055      49 0.000530 +-0.000470   IN   F   RS402   IV-4
0055      50 0.000040 +-0.000550   SN   F   RS402   IV-4
0055      51 0.002440 +-0.001080   SB   F   RS402   IV-4
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0055     56 0.000840 +-0.002690   BA  F  RS402  IV-4
0055     80 0.000230 +-0.000110   HG  F  RS402  IV-4
0055     82 0.061140 +-0.006114   PB  F  RS402  IV-4
0056     13 0.019020 +-0.002580   AL  F  RS462  0-A
0056     14 0.051670 +-0.006170   SI  F  RS462  0-A
0056     15 0.005880 +-0.000820   P   F  RS462  0-A
0056     16 0.129540 +-0.015970   S   F  RS462  0-A
0056     17 0.000000 +-0.000870   CL  F  RS462  0-A
0056     19 0.004450 +-0.000640   K   F  RS462  0-A
0056     20 0.008890 +-0.001120   CA  F  RS462  0-A
0056     22 0.000800 +-0.000150   TI  F  RS462  0-A
0056     23 0.000060 +-0.000070   V   F  RS462  0-A
0056     24 0.000170 +-0.000090   CR  F  RS462  0-A
0056     25 0.000490 +-0.000110   MN  F  RS462  0-A
0056     26 0.020890 +-0.002530   FE  F  RS462  0-A
0056     28 0.001880 +-0.000280   NI  F  RS462  0-A
0056     29 0.071060 +-0.008330   CU  F  RS462  0-A
0056     30 0.024750 +-0.002930   ZN  F  RS462  0-A
0056     33 0.002740 +-0.000960   AS  F  RS462  0-A
0056     34 0.000160 +-0.000090   SE  F  RS462  0-A
0056     35 0.000690 +-0.000150   BR  F  RS462  0-A
0056     38 0.000180 +-0.000150   SR  F  RS462  0-A
0056     46 0.000100 +-0.000450   PD  F  RS462  0-A
0056     47 0.000500 +-0.000640   AG  F  RS462  0-A
0056     48 0.001770 +-0.001130   CD  F  RS462  0-A
0056     49 0.000000 +-0.001010   IN  F  RS462  0-A
0056     50 0.000000 +-0.001150   SN  F  RS462  0-A
0056     51 0.000000 +-0.002350   SB  F  RS462  0-A
0056     56 0.000000 +-0.005960   BA  F  RS462  0-A
0056     80 0.000110 +-0.000190   HG  F  RS462  0-A
0056     82 0.084090 +-0.009880   PB  F  RS462  0-A
0057     13 0.000000 +-0.000420   AL  T  RL093  COMP  0-B
0057     14 0.008070 +-0.000807   SI  T  RL093  COMP  0-B
0057     15 0.002630 +-0.000263   P   T  RL093  COMP  0-B
0057     16 0.027690 +-0.007190   S   T  RL093  COMP  0-B
0057     17 0.011550 +-0.001155   CL  T  RL093  COMP  0-B
0057     19 0.013710 +-0.001371   K   T  RL093  COMP  0-B
0057     20 0.055870 +-0.005587   CA  T  RL093  COMP  0-B
0057     22 0.003120 +-0.000312   TI  T  RL093  COMP  0-B
0057     23 0.000000 +-0.000010   V   T  RL093  COMP  0-B
0057     24 0.000150 +-0.000015   CR  T  RL093  COMP  0-B
0057     25 0.000130 +-0.000013   MN  T  RL093  COMP  0-B
0057     26 0.001520 +-0.000152   FE  T  RL093  COMP  0-B
0057     28 0.000540 +-0.000054   NI  T  RL093  COMP  0-B
0057     29 0.003750 +-0.000375   CU  T  RL093  COMP  0-B
0057     30 0.094110 +-0.009411   ZN  T  RL093  COMP  0-B
0057     33 0.159920 +-0.015992   AS  T  RL093  COMP  0-B
0057     34 0.000660 +-0.000066   SE  T  RL093  COMP  0-B
0057     35 0.012350 +-0.001235   BR  T  RL093  COMP  0-B
0057     38 0.000160 +-0.000040   SR  T  RL093  COMP  0-B
0057     46 0.003540 +-0.000354   PD  T  RL093  COMP  0-B
0057     47 0.001090 +-0.000109   AG  T  RL093  COMP  0-B
0057     48 0.004540 +-0.000454   CD  T  RL093  COMP  0-B
0057     49 0.001570 +-0.000157   IN  T  RL093  COMP  0-B
0057     50 0.016620 +-0.001662   SN  T  RL093  COMP  0-B
0057     51 0.196310 +-0.019631   SB  T  RL093  COMP  0-B
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0057     56 0.000480 +-0.000300   BA   T   RL093   COMP 0-B
0057     80 0.000860 +-0.000090   HG   T   RL093   COMP 0-B
0057     82 0.176560 +-0.017656   PB   T   RL093   COMP 0-B
0058     13 0.022470 +-0.002247   AL   F   RS464   0-C
0058     14 0.152730 +-0.015273   SI   F   RS464   0-C
0058     15 0.003300 +-0.000330   P    F   RS464   0-C
0058     16 0.052950 +-0.005295   S    F   RS464   0-C
0058     17 0.000000 +-0.000320   CL   F   RS464   0-C
0058     19 0.004610 +-0.000461   K    F   RS464   0-C
0058     20 0.002520 +-0.000252   CA   F   RS464   0-C
0058     22 0.002850 +-0.000285   TI   F   RS464   0-C
0058     23 0.000430 +-0.000043   V    F   RS464   0-C
0058     24 0.000790 +-0.000079   CR   F   RS464   0-C
0058     25 0.005960 +-0.000596   MN   F   RS464   0-C
0058     26 0.201290 +-0.020129   FE   F   RS464   0-C
0058     28 0.000700 +-0.000070   NI   F   RS464   0-C
0058     29 0.009820 +-0.000982   CU   F   RS464   0-C
0058     30 0.135610 +-0.013561   ZN   F   RS464   0-C
0058     33 0.004140 +-0.000414   AS   F   RS464   0-C
0058     34 0.000080 +-0.000020   SE   F   RS464   0-C
0058     35 0.000440 +-0.000044   BR   F   RS464   0-C
0058     38 0.005440 +-0.000544   SR   F   RS464   0-C
0058     46 0.000530 +-0.000053   PD   F   RS464   0-C
0058     47 0.001470 +-0.000147   AG   F   RS464   0-C
0058     48 0.002130 +-0.000213   CD   F   RS464   0-C
0058     49 0.000410 +-0.000080   IN   F   RS464   0-C
0058     50 0.000870 +-0.000100   SN   F   RS464   0-C
0058     51 0.001620 +-0.000210   SB   F   RS464   0-C
0058     56 0.000390 +-0.000380   BA   F   RS464   0-C
0058     80 0.000140 +-0.000050   HG   F   RS464   0-C
0058     82 0.096460 +-0.009646   PB   F   RS464   0-C
0059     13 0.045270 +-0.004527   AL   F   RS468   0-D
0059     14 0.111610 +-0.011161   SI   F   RS468   0-D
0059     15 0.008140 +-0.000814   P    F   RS468   0-D
0059     16 0.173130 +-0.017313   S    F   RS468   0-D
0059     17 0.000000 +-0.000920   CL   F   RS468   0-D
0059     19 0.007570 +-0.000757   K    F   RS468   0-D
0059     20 0.007110 +-0.000711   CA   F   RS468   0-D
0059     22 0.002110 +-0.000211   TI   F   RS468   0-D
0059     23 0.000360 +-0.000060   V    F   RS468   0-D
0059     24 0.000640 +-0.000080   CR   F   RS468   0-D
0059     25 0.002560 +-0.000256   MN   F   RS468   0-D
0059     26 0.147840 +-0.014784   FE   F   RS468   0-D
0059     28 0.000900 +-0.000110   NI   F   RS468   0-D
0059     29 0.049760 +-0.004976   CU   F   RS468   0-D
0059     30 0.093190 +-0.009319   ZN   F   RS468   0-D
0059     33 0.005330 +-0.000999   AS   F   RS468   0-D
0059     34 0.000250 +-0.000070   SE   F   RS468   0-D
0059     35 0.000470 +-0.000090   BR   F   RS468   0-D
0059     38 0.001240 +-0.000130   SR   F   RS468   0-D
0059     46 0.000050 +-0.000200   PD   F   RS468   0-D
0059     47 0.004770 +-0.000560   AG   F   RS468   0-D
0059     48 0.000000 +-0.000460   CD   F   RS468   0-D
0059     49 0.000260 +-0.000460   IN   F   RS468   0-D
0059     50 0.002970 +-0.000620   SN   F   RS468   0-D
0059     51 0.002900 +-0.001180   SB   F   RS468   0-D
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0059    56 0.000000 +-0.002650   BA   F   RS468   0-D
0059    80 0.000250 +-0.000150   HG   F   RS468   0-D
0059    82 0.167160 +-0.016716   PB   F   RS468   0-D
0060    13 0.021370 +-0.002137   AL   F   RS470   0-E
0060    14 0.102120 +-0.010212   SI   F   RS470   0-E
0060    15 0.005900 +-0.000590   P    F   RS470   0-E
0060    16 0.113660 +-0.011366   S    F   RS470   0-E
0060    17 0.000000 +-0.000560   CL   F   RS470   0-E
0060    19 0.008470 +-0.000847   K    F   RS470   0-E
0060    20 0.025820 +-0.002582   CA   F   RS470   0-E
0060    22 0.002260 +-0.000226   TI   F   RS470   0-E
0060    23 0.000390 +-0.000040   V    F   RS470   0-E
0060    24 0.000590 +-0.000059   CR   F   RS470   0-E
0060    25 0.007260 +-0.000726   MN   F   RS470   0-E
0060    26 0.128260 +-0.012826   FE   F   RS470   0-E
0060    28 0.001160 +-0.000116   NI   F   RS470   0-E
0060    29 0.025920 +-0.002592   CU   F   RS470   0-E
0060    30 0.113570 +-0.011357   ZN   F   RS470   0-E
0060    33 0.005310 +-0.000620   AS   F   RS470   0-E
0060    34 0.000140 +-0.000040   SE   F   RS470   0-E
0060    35 0.000560 +-0.000060   BR   F   RS470   0-E
0060    38 0.004180 +-0.000418   SR   F   RS470   0-E
0060    46 0.000150 +-0.000100   PD   F   RS470   0-E
0060    47 0.002910 +-0.000291   AG   F   RS470   0-E
0060    48 0.002830 +-0.000330   CD   F   RS470   0-E
0060    49 0.000540 +-0.000220   IN   F   RS470   0-E
0060    50 0.004970 +-0.000497   SN   F   RS470   0-E
0060    51 0.001200 +-0.000530   SB   F   RS470   0-E
0060    56 0.000990 +-0.001250   BA   F   RS470   0-E
0060    80 0.000480 +-0.000100   HG   F   RS470   0-E
0060    82 0.117230 +-0.011723   PB   F   RS470   0-E
0061    13 0.073140 +-0.007890   AL   F   RS472   0-F
0061    14 0.184210 +-0.019400   SI   F   RS472   0-F
0061    15 0.005770 +-0.000710   P    F   RS472   0-F
0061    16 0.066390 +-0.008140   S    F   RS472   0-F
0061    17 0.000670 +-0.000780   CL   F   RS472   0-F
0061    19 0.021010 +-0.002300   K    F   RS472   0-F
0061    20 0.002200 +-0.000330   CA   F   RS472   0-F
0061    22 0.003140 +-0.000380   TI   F   RS472   0-F
0061    23 0.000440 +-0.000090   V    F   RS472   0-F
0061    24 0.000570 +-0.000110   CR   F   RS472   0-F
0061    25 0.004370 +-0.000480   MN   F   RS472   0-F
0061    26 0.160770 +-0.016900   FE   F   RS472   0-F
0061    28 0.000150 +-0.000080   NI   F   RS472   0-F
0061    29 0.008290 +-0.000910   CU   F   RS472   0-F
0061    30 0.009180 +-0.001000   ZN   F   RS472   0-F
0061    33 0.044700 +-0.004780   AS   F   RS472   0-F
0061    34 0.000080 +-0.000080   SE   F   RS472   0-F
0061    35 0.004010 +-0.000450   BR   F   RS472   0-F
0061    38 0.000600 +-0.000140   SR   F   RS472   0-F
0061    46 0.000000 +-0.000340   PD   F   RS472   0-F
0061    47 0.001290 +-0.000520   AG   F   RS472   0-F
0061    48 0.000630 +-0.000790   CD   F   RS472   0-F
0061    49 0.000000 +-0.000800   IN   F   RS472   0-F
0061    50 0.000000 +-0.001000   SN   F   RS472   0-F
0061    51 0.001650 +-0.001840   SB   F   RS472   0-F
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0061      56 0.005380 +-0.004770   BA   F   RS472   0-F
0061      80 0.000100 +-0.000170   HG   F   RS472   0-F
0061      82 0.064470 +-0.008900   PB   F   RS472   0-F
0062      13 0.078190 +-0.007819   AL   F   RS474   0-G
0062      14 0.160760 +-0.016076   SI   F   RS474   0-G
0062      15 0.007620 +-0.000762   P    F   RS474   0-G
0062      16 0.123740 +-0.012374   S    F   RS474   0-G
0062      17 0.000000 +-0.000590   CL   F   RS474   0-G
0062      19 0.014360 +-0.001436   K    F   RS474   0-G
0062      20 0.005840 +-0.000584   CA   F   RS474   0-G
0062      22 0.000000 +-0.000600   TI   F   RS474   0-G
0062      23 0.000560 +-0.000056   V    F   RS474   0-G
0062      24 0.000800 +-0.000080   CR   F   RS474   0-G
0062      25 0.030940 +-0.003094   MN   F   RS474   0-G
0062      26 0.162120 +-0.016212   FE   F   RS474   0-G
0062      28 0.000420 +-0.000042   NI   F   RS474   0-G
0062      29 0.011160 +-0.001116   CU   F   RS474   0-G
0062      30 0.037800 +-0.003780   ZN   F   RS474   0-G
0062      33 0.007050 +-0.000705   AS   F   RS474   0-G
0062      34 0.000070 +-0.000040   SE   F   RS474   0-G
0062      35 0.000730 +-0.000073   BR   F   RS474   0-G
0062      38 0.000210 +-0.000040   SR   F   RS474   0-G
0062      46 0.000290 +-0.000080   PD   F   RS474   0-G
0062      47 0.009720 +-0.000972   AG   F   RS474   0-G
0062      48 0.001990 +-0.000220   CD   F   RS474   0-G
0062      49 0.000210 +-0.000150   IN   F   RS474   0-G
0062      50 0.001630 +-0.000230   SN   F   RS474   0-G
0062      51 0.012640 +-0.001264   SB   F   RS474   0-G
0062      56 0.001890 +-0.000840   BA   F   RS474   0-G
0062      80 0.000000 +-0.000080   HG   F   RS474   0-G
0062      82 0.137380 +-0.013738   PB   F   RS474   0-G
0063      13 0.072410 +-0.007241   AL   F   RS476   0-H
0063      14 0.150150 +-0.015015   SI   F   RS476   0-H
0063      15 0.007600 +-0.000760   P    F   RS476   0-H
0063      16 0.153490 +-0.015349   S    F   RS476   0-H
0063      17 0.000000 +-0.000780   CL   F   RS476   0-H
0063      19 0.011900 +-0.001190   K    F   RS476   0-H
0063      20 0.023260 +-0.002326   CA   F   RS476   0-H
0063      22 0.002420 +-0.000242   TI   F   RS476   0-H
0063      23 0.000200 +-0.000030   V    F   RS476   0-H
0063      24 0.000260 +-0.000030   CR   F   RS476   0-H
0063      25 0.002830 +-0.000283   MN   F   RS476   0-H
0063      26 0.046690 +-0.004669   FE   F   RS476   0-H
0063      28 0.000630 +-0.000063   NI   F   RS476   0-H
0063      29 0.067150 +-0.006715   CU   F   RS476   0-H
0063      30 0.028950 +-0.002895   ZN   F   RS476   0-H
0063      33 0.066070 +-0.006607   AS   F   RS476   0-H
0063      34 0.000260 +-0.000060   SE   F   RS476   0-H
0063      35 0.005630 +-0.000563   BR   F   RS476   0-H
0063      38 0.000330 +-0.000060   SR   F   RS476   0-H
0063      46 0.000520 +-0.000100   PD   F   RS476   0-H
0063      47 0.005340 +-0.000534   AG   F   RS476   0-H
0063      48 0.001180 +-0.000210   CD   F   RS476   0-H
0063      49 0.000510 +-0.000200   IN   F   RS476   0-H
0063      50 0.001570 +-0.000260   SN   F   RS476   0-H
0063      51 0.075620 +-0.007562   SB   F   RS476   0-H
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0063      56 0.000240 +-0 000970   BA   F   RS476   0-H
0063      80 0.000460 +-0.000120   HG   F   RS476   0-H
0063      82 0.203670 +-0.020367   PB   F   RS476   0-H
0064      13 0.037620 +-0.003762   AL   F   RS478   0-I
0064      14 0.075320 +-0 007532   SI   F   RS478   0-I
0064      15 0.010970 +-0.001097   P    F   RS478   0-I
0064      16 0.239230 +-0.024430   S    F   RS478   0-I
0064      17 0.000000 +-0.001540   CL   F   RS478   0-I
0064      19 0.010160 +-0.001016   K    F   RS478   0-I
0064      20 0.025550 +-0.002555   CA   F   RS478   0-I
0064      22 0.002910 +-0.000291   TI   F   RS478   0-I
0064      23 0.000350 +-0.000060   V    F   RS478   0-I
0064      24 0.000360 +-0.000060   CR   F   RS478   0-I
0064      25 0.000720 +-0.000080   MN   F   RS478   0-I
0064      26 0.057360 +-0.005736   FE   F   RS478   0-I
0064      28 0.002280 +-0.000228   NI   F   RS478   0-I
0064      29 0.012860 +-0.001286   CU   F   RS478   0-I
0064      30 0.013830 +-0.001383   ZN   F   RS478   0-I
0064      33 0.000000 +-0.001670   AS   F   RS478   0-I
0064      34 0.000200 +-0.000130   SE   F   RS478   0-I
0064      35 0.000470 +-0.000130   BR   F   RS478   0-I
0064      38 0.000210 +-0.000120   SR   F   RS478   0-I
0064      46 0.000710 +-0.000250   PD   F   RS478   0-I
0064      47 0.000680 +-0.000300   AG   F   RS478   0-I
0064      48 0.001460 +-0.000520   CD   F   RS478   0-I
0064      49 0.000790 +-0.000540   IN   F   RS478   0-I
0064      50 0.000000 +-0.000600   SN   F   RS478   0-I
0064      51 0.000260 +-0.001070   SB   F   RS478   0-I
0064      56 0.001390 +-0.002800   BA   F   RS478   0-I
0064      80 0.000000 +-0.000230   HG   F   RS478   0-I
0064      82 0.427590 +-0.042759   PB   F   RS478   0-I
0065      13 0.015230 +-0.001523   AL   F   RS480   0-J
0065      14 0.031620 +-0.003162   SI   F   RS480   0-J
0065      15 0.007260 +-0.000726   P    F   RS480   0-J
0065      16 0.192260 +-0.019226   S    F   RS480   0-J
0065      17 0.001810 +-0.000660   CL   F   RS480   0-J
0065      19 0.006730 +-0.000673   K    F   RS480   0-J
0065      20 0.042950 +-0.004295   CA   F   RS480   0-J
0065      22 0.003580 +-0.000358   TI   F   RS480   0-J
0065      23 0.000160 +-0.000030   V    F   RS480   0-J
0065      24 0.000610 +-0.000061   CR   F   RS480   0-J
0065      25 0.002570 +-0.000257   MN   F   RS480   0-J
0065      26 0.122920 +-0.012292   FE   F   RS480   0-J
0065      28 0.001190 +-0.000119   NI   F   RS480   0-J
0065      29 0.229300 +-0.022930   CU   F   RS480   0-J
0065      30 0.022520 +-0.002252   ZN   F   RS480   0-J
0065      33 0.019030 +-0.001903   AS   F   RS480   0-J
0065      34 0.000110 +-0.000020   SE   F   RS480   0-J
0065      35 0.001790 +-0.000179   BR   F   RS480   0-J
0065      38 0.000460 +-0.000046   SR   F   RS480   0-J
0065      46 0.000400 +-0.000090   PD   F   RS480   0-J
0065      47 0.023970 +-0 002397   AG   F   RS480   0-J
0065      48 0.000760 +-0.000180   CD   F   RS480   0-J
0065      49 0.000190 +-0.000170   IN   F   RS480   0-J
0065      50 0 004630 +-0.000463   SN   F   RS480   0-J
0065      51 0.145640 +-0.014564   SB   F   RS480   0-J
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0065     56 0.001770 +-0.000920   BA   F   RS480   0-J
0065     80 0.000460 +-0.000070   HG   F   RS480   0-J
0065     82 0.045770 +-0.004577   PB   F   RS480   0-J
0066     13 0.013640 +-0.001670   AL   F   RS483   0-K
0066     14 0.027040 +-0.002704   SI   F   RS483   0-K
0066     15 0.008980 +-0.000900   P    F   RS483   0-K
0066     16 0.208760 +-0.022800   S    F   RS483   0-K
0066     17 0.000000 +-0.001410   CL   F   RS483   0-K
0066     19 0.005490 +-0.000620   K    F   RS483   0-K
0066     20 0.037000 +-0.003700   CA   F   RS483   0-K
0066     22 0.001680 +-0.000200   TI   F   RS483   0-K
0066     23 0.000140 +-0.000050   V    F   RS483   0-K
0066     24 0.000360 +-0.000080   CR   F   RS483   0-K
0066     25 0.001030 +-0.000120   MN   F   RS483   0-K
0066     26 0.040900 +-0.004090   FE   F   RS483   0-K
0066     28 0.000860 +-0.000130   NI   F   RS483   0-K
0066     29 0.075140 +-0.007514   CU   F   RS483   0-K
0066     30 0.031470 +-0.003147   ZN   F   RS483   0-K
0066     33 0.073990 +-0.007399   AS   F   RS483   0-K
0066     34 0.000850 +-0.000150   SE   F   RS483   0-K
0066     35 0.006550 +-0.000655   BR   F   RS483   0-K
0066     38 0.000170 +-0.000120   SR   F   RS483   0-K
0066     46 0.000510 +-0.000300   PD   F   RS483   0-K
0066     47 0.007930 +-0.000980   AG   F   RS483   0-K
0066     48 0.005960 +-0.000970   CD   F   RS483   0-K
0066     49 0.000000 +-0.000670   IN   F   RS483   0-K
0066     50 0.008370 +-0.001260   SN   F   RS483   0-K
0066     51 0.063760 +-0.006550   SB   F   RS483   0-K
0066     56 0.013860 +-0.004090   BA   F   RS483   0-K
0066     80 0.000190 +-0.000240   HG   F   RS483   0-K
0066     82 0.296390 +-0.029639   PB   F   RS483   0-K
0067     13 0.016690 +-0.001669   AL   F   RS485   0-L
0067     14 0.029480 +-0.002948   SI   F   RS485   0-L
0067     15 0.010180 +-0.001018   P    F   RS485   0-L
0067     16 0.210240 +-0.024970   S    F   RS485   0-L
0067     17 0.000000 +-0.001670   CL   F   RS485   0-L
0067     19 0.003680 +-0.000368   K    F   RS485   0-L
0067     20 0.011070 +-0.001107   CA   F   RS485   0-L
0067     22 0.000830 +-0.000083   TI   F   RS485   0-L
0067     23 0.000450 +-0.000050   V    F   RS485   0-L
0067     24 0.000330 +-0.000040   CR   F   RS485   0-L
0067     25 0.000590 +-0.000059   MN   F   RS485   0-L
0067     26 0.012680 +-0.001268   FE   F   RS485   0-L
0067     28 0.001040 +-0.000104   NI   F   RS485   0-L
0067     29 0.041100 +-0.004110   CU   F   RS485   0-L
0067     30 0.010190 +-0.001019   ZN   F   RS485   0-L
0067     33 0.024750 +-0.002475   AS   F   RS485   0-L
0067     34 0.000300 +-0.000140   SE   F   RS485   0-L
0067     35 0.002510 +-0.000251   BR   F   RS485   0-L
0067     38 0.000120 +-0.000130   SR   F   RS485   0-L
0067     46 0.000940 +-0.000160   PD   F   RS485   0-L
0067     47 0.003650 +-0.000365   AG   F   RS485   0-L
0067     48 0.003930 +-0.000440   CD   F   RS485   0-L
0067     49 0.000430 +-0.000300   IN   F   RS485   0-L
0067     50 0.003660 +-0.000440   SN   F   RS485   0-L
0067     51 0.015270 +-0.001527   SB   F   RS485   0-L
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0067     56 0.002570 +-0.001610   BA  F  RS485  0-L
0067     80 0.000010 +-0.000250   HG  F  RS485  0-L
0067     82 0.549510 +-0.054951   PB  F  RS485  0-L
0068     13 0.027670 +-0.002767   AL  F  RS487  0-M
0068     14 0.053190 +-0.005319   SI  F  RS487  0-M
0068     15 0.009550 +-0.000955   P   F  RS487  0-M
0068     16 0.217900 +-0.021790   S   F  RS487  0-M
0068     17 0.000000 +-0.001350   CL  F  RS487  0-M
0068     19 0.004350 +-0.000435   K   F  RS487  0-M
0068     20 0.009760 +-0.000976   CA  F  RS487  0-M
0068     22 0.001020 +-0.000110   TI  F  RS487  0-M
0068     23 0.000290 +-0.000050   V   F  RS487  0-M
0068     24 0.000400 +-0.000060   CR  F  RS487  0-M
0068     25 0.002340 +-0.000234   MN  F  RS487  0-M
0068     26 0.034400 +-0.003440   FE  F  RS487  0-M
0068     28 0.000950 +-0.000110   NI  F  RS487  0-M
0068     29 0.087520 +-0.008752   CU  F  RS487  0-M
0068     30 0.042340 +-0.004234   ZN  F  RS487  0-M
0068     33 0.065180 +-0.006518   AS  F  RS487  0-M
0068     34 0.000350 +-0.000110   SE  F  RS487  0-M
0068     35 0.005820 +-0.000582   BR  F  RS487  0-M
0068     38 0.000130 +-0.000100   SR  F  RS487  0-M
0068     46 0.000870 +-0.000230   PD  F  RS487  0-M
0068     47 0.004030 +-0.000500   AG  F  RS487  0-M
0068     48 0.001260 +-0.000470   CD  F  RS487  0-M
0068     49 0.000000 +-0.000440   IN  F  RS487  0-M
0068     50 0.002050 +-0.000560   SN  F  RS487  0-M
0068     51 0.026770 +-0.002677   SB  F  RS487  0-M
0068     56 0.000000 +-0.002500   BA  F  RS487  0-M
0068     80 0.000480 +-0.000220   HG  F  RS487  0-M
0068     82 0.350120 +-0.035012   PB  F  RS487  0-M
0069     13 0.106100 +-0.010610   AL  F  RS491  0-N
0069     14 0.231210 +-0.023121   SI  F  RS491  0-N
0069     15 0.007170 +-0.000717   P   F  RS491  0-N
0069     16 0.123210 +-0.012321   S   F  RS491  0-N
0069     17 0.000000 +-0.000760   CL  F  RS491  0-N
0069     19 0.021470 +-0.002147   K   F  RS491  0-N
0069     20 0.009280 +-0.000928   CA  F  RS491  0-N
0069     22 0.002810 +-0.000281   TI  F  RS491  0-N
0069     23 0.000220 +-0.000030   V   F  RS491  0-N
0069     24 0.000370 +-0.000037   CR  F  RS491  0-N
0069     25 0.002690 +-0.000269   MN  F  RS491  0-N
0069     26 0.072370 +-0.007237   FE  F  RS491  0-N
0069     28 0.000350 +-0.000040   NI  F  RS491  0-N
0069     29 0.007110 +-0.000711   CU  F  RS491  0-N
0069     30 0.028420 +-0.002842   ZN  F  RS491  0-N
0069     33 0.022100 +-0.002210   AS  F  RS491  0-N
0069     34 0.000140 +-0.000060   SE  F  RS491  0-N
0069     35 0.001910 +-0.000191   BR  F  RS491  0-N
0069     38 0.000100 +-0.000060   SR  F  RS491  0-N
0069     46 0.000450 +-0.000100   PD  F  RS491  0-N
0069     47 0.002600 +-0.000260   AG  F  RS491  0-N
0069     48 0.000890 +-0.000200   CD  F  RS491  0-N
0069     49 0.000020 +-0.000180   IN  F  RS491  0-N
0069     50 0.001000 +-0.000230   SN  F  RS491  0-N
0069     51 0.023800 +-0.002380   SB  F  RS491  0-N
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0069     56 0.001150 +-0.001030   BA   F   RS491   O-N
0069     80 0.000000 +-0.000110   HG   F   RS491   O-N
0069     82 0.214830 +-0.021483   PB   F   RS491   O-N
0070     13 0.000500 +-0.000500   AL   F   HD375   D & L BUILDING
0070     14 0.009000 +-0.002000   SI   F   HD375   D & L BUILDING
0070     15 0.003000 +-0.000300   P    F   HD375   D & L BUILDING
0070     16 0.014000 +-0.020000   S    F   HD375   D & L BUILDING
0070     17 0.020000 +-0.010000   CL   F   HD375   D & L BUILDING
0070     19 0.000200 +-0.000200   K    F   HD375   D & L BUILDING
0070     20 0.000500 +-0.000200   CA   F   HD375   D & L BUILDING
0070     22 0.000100 +-0.000100   TI   F   HD375   D & L BUILDING
0070     23 0.000010 +-0.000010   V    F   HD375   D & L BUILDING
0070     24 0.000160 +-0.000016   CR   F   HD375   D & L BUILDING
0070     25 0.000150 +-0.000020   MN   F   HD375   D & L BUILDING
0070     26 0.001600 +-0.000200   FE   F   HD375   D & L BUILDING
0070     28 0.000560 +-0.000056   NI   F   HD375   D & L BUILDING
0070     29 0.002210 +-0.000221   CU   F   HD375   D & L BUILDING
0070     30 0.008670 +-0.000867   ZN   F   HD375   D & L BUILDING
0070     33 0.086920 +-0.008692   AS   F   HD375   D & L BUILDING
0070     34 0.001550 +-0.000155   SE   F   HD375   D & L BUILDING
0070     35 0.001000 +-0.000500   BR   F   HD375   D & L BUILDING
0070     38 0.000300 +-0.000100   SR   F   HD375   D & L BUILDING
0070     46 0.027020 +-0.002702   PD   F   HD375   D & L BUILDING
0070     47 0.006990 +-0.000699   AG   F   HD375   D & L BUILDING
0070     48 0.088590 +-0.008859   CD   F   HD375   D & L BUILDING
0070     49 0.000020 +-0.000010   IN   F   HD375   D & L BUILDING
0070     50 0.025410 +-0.002541   SN   F   HD375   D & L BUILDING
0070     51 0.023800 +-0.002380   SB   F   HD375   D & L BUILDING
0070     56 0.005220 +-0.000522   BA   F   HD375   D & L BUILDING
0070     80 0.001290 +-0.000180   HG   F   HD375   D & L BUILDING
0070     82 0.465030 +-0.046503   PB   F   HD375   D & L BUILDING
0071     13 0.013000 +-0.002000   AL   F   HD381   NEW DEAL
0071     14 0.038000 +-0.004000   SI   F   HD381   NEW DEAL
0071     15 0.005000 +-0.001000   P    F   HD381   NEW DEAL
0071     16 0.080000 +-0.010000   S    F   HD381   NEW DEAL
0071     17 0.010000 +-0.001000   CL   F   HD381   NEW DEAL
0071     19 0.008800 +-0.001000   K    F   HD381   NEW DEAL
0071     20 0.022000 +-0.002200   CA   F   HD381   NEW DEAL
0071     22 0.001000 +-0.000300   TI   F   HD381   NEW DEAL
0071     23 0.000050 +-0.000030   V    F   HD381   NEW DEAL
0071     24 0.000920 +-0.000100   CR   F   HD381   NEW DEAL
0071     25 0.002000 +-0.000300   MN   F   HD381   NEW DEAL
0071     26 0.037000 +-0.004000   FE   F   HD381   NEW DEAL
0071     28 0.000400 +-0.000100   NI   F   HD381   NEW DEAL
0071     29 0.012000 +-0.002000   CU   F   HD381   NEW DEAL
0071     30 0.034920 +-0.003492   ZN   F   HD381   NEW DEAL
0071     33 0.013400 +-0.001340   AS   F   HD381   NEW DEAL
0071     34 0.000240 +-0.000070   SE   F   HD381   NEW DEAL
0071     35 0.002000 +-0.000500   BR   F   HD381   NEW DEAL
0071     38 0.000560 +-0.000090   SR   F   HD381   NEW DEAL
0071     46 0.000440 +-0.000210   PD   F   HD381   NEW DEAL
0071     47 0.001400 +-0.000390   AG   F   HD381   NEW DEAL
0071     48 0.007880 +-0.000900   CD   F   HD381   NEW DEAL
0071     49 0.000130 +-0.000020   IN   F   HD381   NEW DEAL
0071     50 0.001010 +-0.000640   SN   F   HD381   NEW DEAL
0071     51 0.002990 +-0.001320   SB   F   HD381   NEW DEAL
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0071     56 0.001720 +-0.002970   BA   F   HD381   NEW DEAL
0071     80 0.000420 +-0.000140   HG   F   HD381   NEW DEAL
0071     82 0.103370 +-0.010337   PB   F   HD381   NEW DEAL
0072     13 0.015000 +-0.001500   AL   F   HD391   ZINC PLANT
0072     14 0.033000 +-0.003300   SI   F   HD391   ZINC PLANT
0072     15 0.002140 +-0.000214   P    F   HD391   ZINC PLANT
0072     16 0.032890 +-0.004570   S    F   HD391   ZINC PLANT
0072     17 0.016000 +-0.003000   CL   F   HD391   ZINC PLANT
0072     19 0.020000 +-0.005000   K    F   HD391   ZINC PLANT
0072     20 0.001000 +-0.002000   CA   F   HD391   ZINC PLANT
0072     22 0.000490 +-0.000049   TI   F   HD391   ZINC PLANT
0072     23 0.000060 +-0.000010   V    F   HD391   ZINC PLANT
0072     24 0.000110 +-0.000011   CR   F   HD391   ZINC PLANT
0072     25 0.000100 +-0.000050   MN   F   HD391   ZINC PLANT
0072     26 0.004890 +-0.000489   FE   F   HD391   ZINC PLANT
0072     28 0.000500 +-0.000050   NI   F   HD391   ZINC PLANT
0072     29 0.002930 +-0.000293   CU   F   HD391   ZINC PLANT
0072     30 0.228440 +-0.022844   ZN   F   HD391   ZINC PLANT
0072     33 0.009280 +-0.000928   AS   F   HD391   ZINC PLANT
0072     34 0.000260 +-0.000030   SE   F   HD391   ZINC PLANT
0072     35 0.000100 +-0.000020   BR   F   HD391   ZINC PLANT
0072     38 0.000180 +-0.000020   SR   F   HD391   ZINC PLANT
0072     46 0.003340 +-0.000334   PD   F   HD391   ZINC PLANT
0072     47 0.000940 +-0.000094   AG   F   HD391   ZINC PLANT
0072     48 0.002540 +-0.000254   CD   F   HD391   ZINC PLANT
0072     49 0.000070 +-0.000010   IN   F   HD391   ZINC PLANT
0072     50 0.004550 +-0.000455   SN   F   HD391   ZINC PLANT
0072     51 0.003110 +-0.000311   SB   F   HD391   ZINC PLANT
0072     56 0.000560 +-0.000130   BA   F   HD391   ZINC PLANT
0072     80 0.000290 +-0.000040   HG   F   HD391   ZINC PLANT
0072     82 0.102900 +-0.010290   PB   F   HD391   ZINC PLANT
0073     13 0.000300 +-0.000100   AL   F   HD393   DROSS BLDG
0073     14 0.002000 +-0.001000   SI   F   HD393   DROSS BLDG
0073     15 0.001250 +-0.000125   P    F   HD393   DROSS BLDG
0073     16 0.016670 +-0.002440   S    F   HD393   DROSS BLDG
0073     17 0.000000 +-0.000170   CL   F   HD393   DROSS BLDG
0073     19 0.001080 +-0.000108   K    F   HD393   DROSS BLDG
0073     20 0.006000 +-0.001000   CA   F   HD393   DROSS BLDG
0073     22 0.000600 +-0.000060   TI   F   HD393   DROSS BLDG
0073     23 0.000040 +-0.000010   V    F   HD393   DROSS BLDG
0073     24 0.000100 +-0.000010   CR   F   HD393   DROSS BLDG
0073     25 0.000130 +-0.000013   MN   F   HD393   DROSS BLDG
0073     26 0.001060 +-0.000106   FE   F   HD393   DROSS BLDG
0073     28 0.000540 +-0.000054   NI   F   HD393   DROSS BLDG
0073     29 0.001400 +-0.000140   CU   F   HD393   DROSS BLDG
0073     30 0.023610 +-0.002361   ZN   F   HD393   DROSS BLDG
0073     33 0.578180 +-0.057818   AS   F   HD393   DROSS BLDG
0073     34 0.001150 +-0.000115   SE   F   HD393   DROSS BLDG
0073     35 0.000070 +-0.000010   BR   F   HD393   DROSS BLDG
0073     38 0.000070 +-0.000020   SR   F   HD393   DROSS BLDG
0073     46 0.023890 +-0.002389   PD   F   HD393   DROSS BLDG
0073     47 0.008540 +-0.000854   AG   F   HD393   DROSS BLDG
0073     48 0.011640 +-0.001164   CD   F   HD393   DROSS BLDG
0073     49 0.000230 +-0.000070   IN   F   HD393   DROSS BLDG
0073     50 0.001910 +-0.000191   SN   F   HD393   DROSS BLDG
0073     51 0.052000 +-0.010000   SB   F   HD393   DROSS BLDG
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0073      56 0.000780 +-0.000220   BA   F   HD393   DROSS BLDG
0073      80 0.002690 +-0.000269   HG   F   HD393   DROSS BLDG
0073      82 0.055610 +-0.005561   PB   F   HD393   DROSS BLDG
0074      13 0.000500 +-0.000200   AL   F   HD403   ZINC BAGHOUSE
0074      14 0.007790 +-0.000779   SI   F   HD403   ZINC BAGHOUSE
0074      15 0.003110 +-0.000311   P    F   HD403   ZINC BAGHOUSE
0074      16 0.062540 +-0.006390   S    F   HD403   ZINC BAGHOUSE
0074      17 0.000000 +-0.000540   CL   F   HD403   ZINC BAGHOUSE
0074      19 0.009490 +-0.000949   K    F   HD403   ZINC BAGHOUSE
0074      20 0.005000 +-0.003000   CA   F   HD403   ZINC BAGHOUSE
0074      22 0.000420 +-0.000050   TI   F   HD403   ZINC BAGHOUSE
0074      23 0.000050 +-0.000050   V    F   HD403   ZINC BAGHOUSE
0074      24 0.000160 +-0.000030   CR   F   HD403   ZINC BAGHOUSE
0074      25 0.000050 +-0.000020   MN   F   HD403   ZINC BAGHOUSE
0074      26 0.002210 +-0.000221   FE   F   HD403   ZINC BAGHOUSE
0074      28 0.000950 +-0.000095   NI   F   HD403   ZINC BAGHOUSE
0074      29 0.002590 +-0.000259   CU   F   HD403   ZINC BAGHOUSE
0074      30 0.501400 +-0.050140   ZN   F   HD403   ZINC BAGHOUSE
0074      33 0.022980 +-0.002298   AS   F   HD403   ZINC BAGHOUSE
0074      34 0.000110 +-0.000050   SE   F   HD403   ZINC BAGHOUSE
0074      35 0.000300 +-0.000100   BR   F   HD403   ZINC BAGHOUSE
0074      38 0.000010 +-0.000050   SR   F   HD403   ZINC BAGHOUSE
0074      46 0.000340 +-0.000140   PD   F   HD403   ZINC BAGHOUSE
0074      47 0.000320 +-0.000190   AG   F   HD403   ZINC BAGHOUSE
0074      48 0.000800 +-0.000310 . CD   F   HD403   ZINC BAGHOUSE
0074      49 0.000300 +-0.000100   IN   F   HD403   ZINC BAGHOUSE
0074      50 0.010660 +-0.001066   SN   F   HD403   ZINC BAGHOUSE
0074      51 0.007170 +-0.000920   SB   F   HD403   ZINC BAGHOUSE
0074      56 0.000080 +-0.001620   BA   F   HD403   ZINC BAGHOUSE
0074      80 0.010480 +-0.003110   HG   F   HD403   ZINC BAGHOUSE
0074      82 0.124400 +-0.012440   PB   F   HD403   ZINC BAGHOUSE
0075      13 0.000100 +-0.000020   AL   F   HD409   BLAST F UPSET
0075      14 0.000300 +-0.000100   SI   F   HD409   BLAST F UPSET
0075      15 0.003530 +-0.000353   P    F   HD409   BLAST F UPSET
0075      16 0.196610 +-0.020770   S    F   HD409   BLAST F UPSET
0075      17 0.040000 +-0.010000   CL   F   HD409   BLAST F UPSET
0075      19 0.023210 +-0.002321   K    F   HD409   BLAST F UPSET
0075      20 0.005000 +-0.001000   CA   F   HD409   BLAST F UPSET
0075      22 0.000330 +-0.000033   TI   F   HD409   BLAST F UPSET
0075      23 0.000000 +-0.000001   V    F   HD409   BLAST F UPSET
0075      24 0.000170 +-0.000017   CR   F   HD409   BLAST F UPSET
0075      25 0.000060 +-0.000020   MN   F   HD409   BLAST F UPSET
0075      26 0.001240 +-0.000124   FE   F   HD409   BLAST F UPSET
0075      28 0.000630 +-0.000063   NI   F   HD409   BLAST F UPSET
0075      29 0.001840 +-0.000184   CU   F   HD409   BLAST F UPSET
0075      30 0.075360 +-0.007536   ZN   F   HD409   BLAST F UPSET
0075      33 0.033490 +-0.003349   AS   F   HD409   BLAST F UPSET
0075      34 0.000720 +-0.000100   SE   F   HD409   BLAST F UPSET
0075      35 0.001100 +-0.000300   BR   F   HD409   BLAST F UPSET
0075      38 0.000350 +-0.000100   SR   F   HD409   BLAST F UPSET
0075      46 0.003080 +-0.000308   PD   F   HD409   BLAST F UPSET
0075      47 0.001520 +-0.000152   AG   F   HD409   BLAST F UPSET
0075      48 0.164730 +-0.016473   CD   F   HD409   BLAST F UPSET
0075      49 0.000300 +-0.000100   IN   F   HD409   BLAST F UPSET
0075      50 0.005850 +-0.000585   SN   F   HD409   BLAST F UPSET
0075      51 0.002970 +-0.000500   SB   F   HD409   BLAST F UPSET
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0075      56 0.001440 +-0.000500   BA   F   HD409   BLAST F UPSET
0075      80 0.001170 +-0.000180   HG   F   HD409   BLAST F UPSET
0075      82 0.439490 +-0.043949   PB   F   HD409   BLAST F UPSET
0076      13 0.009000 +-0.002000   AL   F   HD387   MAIN SINTER ST
0076      14 0.030000 +-0.010000   SI   F   HD387   MAIN SINTER ST
0076      15 0.007980 +-0.000798   P    F   HD387   MAIN SINTER ST
0076      16 0.158290 +-0.015829   S    F   HD387   MAIN SINTER ST
0076      17 0.010000 +-0.005000   CL   F   HD387   MAIN SINTER ST
0076      19 0.008890 +-0.000889   K    F   HD387   MAIN SINTER ST
0076      20 0.026000 +-0.003000   CA   F   HD387   MAIN SINTER ST
0076      22 0.001690 +-0.000169   TI   F   HD387   MAIN SINTER ST
0076      23 0.000040 +-0.000010   V    F   HD387   MAIN SINTER ST
0076      24 0.000460 +-0.000050   CR   F   HD387   MAIN SINTER ST
0076      25 0.003800 +-0.000800   MN   F   HD387   MAIN SINTER ST
0076      26 0.057640 +-0.005764   FE   F   HD387   MAIN SINTER ST
0076      28 0.000820 +-0.000082   NI   F   HD387   MAIN SINTER ST
0076      29 0.014980 +-0.001498   CU   F   HD387   MAIN SINTER ST
0076      30 0.041740 +-0.004174   ZN   F   HD387   MAIN SINTER ST
0076      33 0.049480 +-0.004948   AS   F   HD387   MAIN SINTER ST
0076      34 0.001290 +-0.000130   SE   F   HD387   MAIN SINTER ST
0076      35 0.000800 +-0.000200   BR   F   HD387   MAIN SINTER ST
0076      38 0.001980 +-0.000198   SR   F   HD387   MAIN SINTER ST
0076      46 0.000330 +-0.000170   PD   F   HD387   MAIN SINTER ST
0076      47 0.002460 +-0.000340   AG   F   HD387   MAIN SINTER ST
0076      48 0.013580 +-0.001358   CD   F   HD387   MAIN SINTER ST
0076      49 0.000150 +-0.000030   IN   F   HD387   MAIN SINTER ST
0076      50 0.002340 +-0.000490   SN   F   HD387   MAIN SINTER ST
0076      51 0.019070 +-0.001907   SB   F   HD387   MAIN SINTER ST
0076      56 0.001150 +-0.002050   BA   F   HD387   MAIN SINTER ST
0076      80 0.001720 +-0.000220   HG   F   HD387   MAIN SINTER ST
0076      82 0.266100 +-0.026610   PB   F   HD387   MAIN SINTER ST
0077      13 0.005000 +-0.001000   AL   F   HD401   ZINC STACK DSS
0077      14 0.015000 +-0.003000   SI   F   HD401   ZINC STACK DSS
0077      15 0.001640 +-0.000164   P    F   HD401   ZINC STACK DSS
0077      16 0.025670 +-0.003340   S    F   HD401   ZINC STACK DSS
0077      17 0.017000 +-0.004000   CL   F   HD401   ZINC STACK DSS
0077      19 0.005500 +-0.000550   K    F   HD401   ZINC STACK DSS
0077      20 0.002000 +-0.001000   CA   F   HD401   ZINC STACK DSS
0077      22 0.000260 +-0.000026   TI   F   HD401   ZINC STACK DSS
0077      23 0.000000 +-0.000001   V    F   HD401   ZINC STACK DSS
0077      24 0.000110 +-0.000011   CR   F   HD401   ZINC STACK DSS
0077      25 0.000020 +-0.000010   MN   F   HD401   ZINC STACK DSS
0077      26 0.001640 +-0.000164   FE   F   HD401   ZINC STACK DSS
0077      28 0.000980 +-0.000098   NI   F   HD401   ZINC STACK DSS
0077      29 0.002070 +-0.000207   CU   F   HD401   ZINC STACK DSS
0077      30 0.535170 +-0.053517   ZN   F   HD401   ZINC STACK DSS
0077      33 0.014240 +-0.001424   AS   F   HD401   ZINC STACK DSS
0077      34 0.000110 +-0.000020   SE   F   HD401   ZINC STACK DSS
0077      35 0.000060 +-0.000020   BR   F   HD401   ZINC STACK DSS
0077      38 0.000060 +-0.000020   SR   F   HD401   ZINC STACK DSS
0077      46 0.001280 +-0.000128   PD   F   HD401   ZINC STACK DSS
0077      47 0.000480 +-0.000060   AG   F   HD401   ZINC STACK DSS
0077      48 0.000840 +-0.000100   CD   F   HD401   ZINC STACK DSS
0077      49 0.000560 +-0.000080   IN   F   HD401   ZINC STACK DSS
0077      50 0.007030 +-0.000703   SN   F   HD401   ZINC STACK DSS
0077      51 0.005450 +-0.000545   SB   F   HD401   ZINC STACK DSS
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0077      56 0.000000 +-0.000390   BA   F   HD401   ZINC STACK DSS
0077      80 0.000640 +-0.000064   HG   F   HD401   ZINC STACK DSS
0077      82 0.074590 +-0.007459   PB   F   HD401   ZINC STACK DSS
0078      13 0.001000 +-0.001000   AL   F   HD411   BAGHOUSE STACK
0078      14 0.002000 +-0.002000   SI   F   HD411   BAGHOUSE STACK
0078      15 0.007640 +-0.000764   P    F   HD411   BAGHOUSE STACK
0078      16 0.132690 +-0.014460   S    F   HD411   BAGHOUSE STACK
0078      17 0.050000 +-0.008000   CL   F   HD411   BAGHOUSE STACK
0078      19 0.020750 +-0.002075   K    F   HD411   BAGHOUSE STACK
0078      20 0.005500 +-0.000550   CA   F   HD411   BAGHOUSE STACK
0078      22 0.000270 +-0.000027   TI   F   HD411   BAGHOUSE STACK
0078      23 0.000010 +-0.000010   V    F   HD411   BAGHOUSE STACK
0078      24 0.000200 +-0.000020   CR   F   HD411   BAGHOUSE STACK
0078      25 0.000070 +-0.000010   MN   F   HD411   BAGHOUSE STACK
0078      26 0.001310 +-0.000131   FE   F   HD411   BAGHOUSE STACK
0078      28 0.000600 +-0.000060   NI   F   HD411   BAGHOUSE STACK
0078      29 0.003540 +-0.000354   CU   F   HD411   BAGHOUSE STACK
0078      30 0.152170 +-0.015217   ZN   F   HD411   BAGHOUSE STACK
0078      33 0.030470 +-0.003047   AS   F   HD411   BAGHOUSE STACK
0078      34 0.000370 +-0.000080   SE   F   HD411   BAGHOUSE STACK
0078      35 0.001300 +-0.000300   BR   F   HD411   BAGHOUSE STACK
0078      38 0.000100 +-0.000070   SR   F   HD411   BAGHOUSE STACK
0078      46 0.002010 +-0.000201   PD   F   HD411   BAGHOUSE STACK
0078      47 0.001660 +-0.000166   AG   F   HD411   BAGHOUSE STACK
0078      48 0.235030 +-0.023503   CD   F   HD411   BAGHOUSE STACK
0078      49 0.000150 +-0.000030   IN   F   HD411   BAGHOUSE STACK
0078      50 0.005010 +-0.000501   SN   F   HD411   BAGHOUSE STACK
0078      51 0.001370 +-0.000650   SB   F   HD411   BAGHOUSE STACK
0078      56 0.001780 +-0.000660   BA   F   HD411   BAGHOUSE STACK
0078      80 0.000220 +-0.000130   HG   F   HD411   BAGHOUSE STACK
0078      82 0.308670 +-0.030867   PB   F   HD411   BAGHOUSE STACK
0079      13 0.004200 +-0.001000   AL   T   HT304   SLAG POUR
0079      14 0.019000 +-0.005000   SI   T   HT304   SLAG POUR
0079      15 0.002660 +-0.000266   P    T   HT304   SLAG POUR
0079      16 0.055230 +-0.005523   S    T   HT304   SLAG POUR
0079      17 0.000900 +-0.000200   CL   T   HT304   SLAG POUR
0079      19 0.041740 +-0.004174   K    T   HT304   SLAG POUR
0079      20 0.026000 +-0.004000   CA   T   HT304   SLAG POUR
0079      22 0.001040 +-0.000104   TI   T   HT304   SLAG POUR
0079      23 0.000010 +-0.000010   V    T   HT304   SLAG POUR
0079      24 0.000200 +-0.000030   CR   T   HT304   SLAG POUR
0079      25 0.001000 +-0.000300   MN   T   HT304   SLAG FOUR
0079      26 0.037350 +-0.003735   FE   T   HT304   SLAG POUR
0079      28 0.000660 +-0.000070   NI   T   HT304   SLAG POUR
0079      29 0.003750 +-0.000375   CU   T   HT304   SLAG POUR
0079      30 0.324770 +-0.032477   ZN   T   HT304   SLAG POUR
0079      33 0.051960 +-0.005196   AS   T   HT304   SLAG POUR
0079      34 0.002080 +-0.000208   SE   T   HT304   SLAG POUR
0079      35 0.000040 +-0.000010   BR   T   HT304   SLAG POUR
0079      38 0.000520 +-0.000052   SR   T   HT304   SLAG POUR
0079      46 0.000100 +-0.000080   PD   T   HT304   SLAG POUR
0079      47 0.001300 +-0.000190   AG   T   HT304   SLAG POUR
0079      48 0.001590 +-0.000240   CD   T   HT304   SLAG POUR
0079      49 0.000110 +-0.000040   IN   T   HT304   SLAG POUR
0079      50 0.038490 +-0.003849   SN   T   HT304   SLAG POUR
0079      51 0.016260 +-0.001626   SB   T   HT304   SLAG POUR
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0079      56 0.000000 +-0.001020   BA   T   HT304   SLAG POUR
0079      80 0.000920 +-0.000110   HG   T   HT304   SLAG POUR
0079      82 0.031560 +-0.003156   PB   T   HT304   SLAG POUR
0080      13 0.002000 +-0.001000   AL   F   HD415   ZINC KILN ROOM
0080      14 0.006000 +-0.003000   SI   F   HD415   ZINC KILN ROOM
0080      15 0.002920 +-0.000292   P    F   HD415   ZINC KILN ROOM
0080      16 0.043510 +-0.004351   S    F   HD415   ZINC KILN ROOM
0080      17 0.010080 +-0.001008   CL   F   HD415   ZINC KILN ROOM
0080      19 0.006950 +-0.000695   K    F   HD415   ZINC KILN ROOM
0080      20 0.003000 +-0.001000   CA   F   HD415   ZINC KILN ROOM
0080      22 0.000390 +-0.000040   TI   F   HD415   ZINC KILN ROOM
0080      23 0.000010 +-0.000010   V    F   HD415   ZINC KILN ROOM
0080      24 0.000140 +-0.000020   CR   F   HD415   ZINC KILN ROOM
0080      25 0.000380 +-0.000080   MN   F   HD415   ZINC KILN ROOM
0080      26 0.005460 +-0.000546   FE   F   HD415   ZINC KILN ROOM
0080      28 0.000930 +-0.000093   NI   F   HD415   ZINC KILN ROOM
0080      29 0.002440 +-0.000244   CU   F   HD415   ZINC KILN ROOM
0080      30 0.490160 +-0.049016   ZN   F   HD415   ZINC KILN ROOM
0080      33 0.010490 +-0.001049   AS   F   HD415   ZINC KILN ROOM
0080      34 0.001480 +-0.000148   SE   F   HD415   ZINC KILN ROOM
0080      35 0.000300 +-0.000100   BR   F   HD415   ZINC KILN ROOM
0080      38 0.000010 +-0.000030   SR   F   HD415   ZINC KILN ROOM
0080      46 0.000610 +-0.000110   PD   F   HD415   ZINC KILN ROOM
0080      47 0.000130 +-0.000110   AG   F   HD415   ZINC KILN ROOM
0080      48 0.002490 +-0.000270   CD   F   HD415   ZINC KILN ROOM
0080      49 0.000200 +-0.000080   IN   F   HD415   ZINC KILN ROOM
0080      50 0.003350 +-0.000335   SN   F   HD415   ZINC KILN ROOM
0080      51 0.001370 +-0.000440   SB   F   HD415   ZINC KILN ROOM
0080      56 0.000530 +-0.000980   BA   F   HD415   ZINC KILN ROOM
0080      80 0.000610 +-0.000080   HG   F   HD415   ZINC KILN ROOM
0080      82 0.084680 +-0.008468   PB   F   HD415   ZINC KILN ROOM
0081      13 0.004230 +-0.000450   AL   T   HT301   ZINC KLN DISCH
0081      14 0.005740 +-0.000574   SI   T   HT301   ZINC KLN DISCH
0081      15 0.001880 +-0.000188   P    T   HT301   ZINC KLN DISCH
0081      16 0.032900 +-0.005160   S    T   HT301   ZINC KLN DISCH
0081      17 0.004270 +-0.000570   CL   T   HT301   ZINC KLN DISCH
0081      19 0.006150 +-0.000615   K    T   HT301   ZINC KLN DISCH
0081      20 0.002310 +-0.000231   CA   T   HT301   ZINC KLN DISCH
0081      22 0.000310 +-0.000031   TI   T   HT301   ZINC KLN DISCH
0081      23 0.000110 +-0.000020   V    T   HT301   ZINC KLN DISCH
0081      24 0.000180 +-0.000020   CR   T   HT301   ZINC KLN DISCH
0081      25 0.000210 +-0.000021   MN   T   HT301   ZINC KLN DISCH
0081      26 0.001880 +-0.000188   FE   T   HT301   ZINC KLN DISCH
0081      28 0.001060 +-0.000106   NI   T   HT301   ZINC KLN DISCH
0081      29 0.002540 +-0.000254   CU   T   HT301   ZINC KLN DISCH
0081      30 0.631820 +-0.063182   ZN   T   HT301   ZINC KLN DISCH
0081      33 0.011840 +-0.001184   AS   T   HT301   ZINC KLN DISCH
0081      34 0.003770 +-0.000377   SE   T   HT301   ZINC KLN DISCH
0081      35 0.001200 +-0.000120   BR   T   HT301   ZINC KLN DISCH
0081      38 0.000030 +-0.000040   SR   T   HT301   ZINC KLN DISCH
0081      46 0.000550 +-0.000110   PD   T   HT301   ZINC KLN DISCH
0081      47 0.000360 +-0.000100   AG   T   HT301   ZINC KLN DISCH
0081      48 0.000800 +-0.000180   CD   T   HT301   ZINC KLN DISCH
0081      49 0.000330 +-0.000160   IN   T   HT301   ZINC KLN DISCH
0081      50 0.004240 +-0.000424   SN   T   HT301   ZINC KLN DISCH
0081      51 0.003910 +-0.000530   SB   T   HT301   ZINC KLN DISCH
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0081      56 0.000000 +-0.000780   BA   T   HT301  ZINC KLN DISCH
0081      80 0.000640 +-0.000100   HG   T   HT301  ZINC KLN DISCH
0081      82 0.116640 +-0.011664   PB   T   HT301  ZINC KLN DISCH
0082      13 0.003470 +-0.000347   AL   T   HT305  CU KILN STACK
0082      14 0.003620 +-0.000362   SI   T   HT305  CU KILN STACK
0082      15 0.001930 +-0.000193   P    T   HT305  CU KILN STACK
0082      16 0.044880 +-0.004488   S    T   HT305  CU KILN STACK
0082      17 0.021160 +-0.002116   CL   T   HT305  CU KILN STACK
0082      19 0.002110 +-0.000211   K    T   HT305  CU KILN STACK
0082      20 0.007500 +-0.001000   CA   T   HT305  CU KILN STACK
0082      22 0.000180 +-0.000030   TI   T   HT305  CU KILN STACK
0082      23 0.000000 +-0.000001   V    T   HT305  CU KILN STACK
0082      24 0.000140 +-0.000020   CR   T   HT305  CU KILN STACK
0082      25 0.000010 +-0.000010   MN   T   HT305  CU KILN STACK
0082      26 0.001000 +-0.001000   FE   T   HT305  CU KILN STACK
0082      28 0.002030 +-0.000203   NI   T   HT305  CU KILN STACK
0082      29 0.541510 +-0.054151   CU   T   HT305  CU KILN STACK
0082      30 0.001270 +-0.000390   ZN   T   HT305  CU KILN STACK
0082      33 0.000000 +-0.000080   AS   T   HT305  CU KILN STACK
0082      34 0.000060 +-0.000020   SE   T   HT305  CU KILN STACK
0082      35 0.000180 +-0.000030   BR   T   HT305  CU KILN STACK
0082      38 0.000110 +-0.000020   SR   T   HT305  CU KILN STACK
0082      46 0.000110 +-0.000070   PD   T   HT305  CU KILN STACK
0082      47 0.000010 +-0.000010   AG   T   HT305  CU KILN STACK
0082      48 0.000880 +-0.000160   CD   T   HT305  CU KILN STACK
0082      49 0.000000 +-0.000001   IN   T   HT305  CU KILN STACK
0082      50 0.000090 +-0.000180   SN   T   HT305  CU KILN STACK
0082      51 0.000030 +-0.000010   SB   T   HT305  CU KILN STACK
0082      56 0.000130 +-0.000830   BA   T   HT305  CU KILN STACK
0082      80 0.000060 +-0.000040   HG   T   HT305  CU KILN STACK
0082      82 0.002340 +-0.000234   PB   T   HT305  CU KILN STACK
0083      13 0.000100 +-0.000040   AL   T   HT319  HT319
0083      14 0.000090 +-0.000030   SI   T   HT319  HT319
0083      15 0.000100 +-0.000020   P    T   HT319  HT319
0083      16 0.001150 +-0.000115   S    T   HT319  HT319
0083      17 0.000040 +-0.000020   CL   T   HT319  HT319
0083      19 0.000000 +-0.000010   K    T   HT319  HT319
0083      20 0.000000 +-0.000010   CA   T   HT319  HT319
0083      22 0.000000 +-0.000001   TI   T   HT319  HT319
0083      23 0.000000 +-0.000001   V    T   HT319  HT319
0083      24 0.000000 +-0.000001   CR   T   HT319  HT319
0083      25 0.000000 +-0.000001   MN   T   HT319  HT319
0083      26 0.000000 +-0.000010   FE   T   HT319  HT319
0083      28 0.000000 +-0.000001   NI   T   HT319  HT319
0083      29 0.000710 +-0.000071   CU   T   HT319  HT319
0083      30 0.000000 +-0.000001   ZN   T   HT319  HT319
0083      33 0.000000 +-0.000010   AS   T   HT319  HT319
0083      34 0.000000 +-0.000001   SE   T   HT319  HT319
0083      35 0.000000 +-0.000001   BR   T   HT319  HT319
0083      38 0.000000 +-0.000001   SR   T   HT319  HT319
0083      46 0.000000 +-0.000010   PD   T   HT319  HT319
0083      47 0.000020 +-0.000020   AG   T   HT319  HT319
0083      48 0.000000 +-0.000020   CD   T   HT319  HT319
0083      49 0.000000 +-0.000030   IN   T   HT319  HT319
0083      50 0.000000 +-0.000030   SN   T   HT319  HT319
0083      51 0.000000 +-0.000060   SB   T   HT319  HT319
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0083     56 0.000000 +-0.000150   BA   T  HT319   HT319
0083     80 0.000000 +-0.000001   HG   T  HT319   HT319
0083     82 0.000000 +-0.000010   PB   T  HT319   HT319
0084     13 0.004750 +-0.000490   AL   C  RS415   II-1
0084     14 0.009750 +-0.000710   SI   C  RS415   II-1
0084     15 0.003820 +-0.000290   P    C  RS415   II-1
0084     16 0.010920 +-0.000910   S    C  RS415   II-1
0084     17 0.000110 +-0.000150   CL   C  RS415   II-1
0084     19 0.000600 +-0.000090   K    C  RS415   II-1
0084     20 0.000830 +-0.000100   CA   C  RS415   II-1
0084     22 0.000120 +-0.000030   TI   C  RS415   II-1
0084     23 0.000010 +-0.000020   V    C  RS415   II-1
0084     24 0.000040 +-0.000030   CR   C  RS415   II-1
0084     25 0.000040 +-0.000030   MN   C  RS415   II-1
0084     26 0.001620 +-0.000170   FE   C  RS415   II-1
0084     28 0.000040 +-0.000030   NI   C  RS415   II-1
0084     29 0.002040 +-0.000150   CU   C  RS415   II-1
0084     30 0.003120 +-0.000220   ZN   C  RS415   II-1
0084     33 0.000210 +-0.000070   AS   C  RS415   II-1
0084     34 0.000020 +-0.000020   SE   C  RS415   II-1
0084     35 0.000030 +-0.000030   BR   C  RS415   II-1
0084     38 0.000000 +-0.000040   SR   C  RS415   II-1
0084     46 0.000000 +-0.000150   PD   C  RS415   II-1
0084     47 0.000000 +-0.000190   AG   C  RS415   II-1
0084     48 0.000000 +-0.000280   CD   C  RS415   II-1
0084     49 0.000370 +-0.000320   IN   C  RS415   II-1
0084     50 0.000000 +-0.000380   SN   C  RS415   II-1
0084     51 0.000000 +-0.000700   SB   C  RS415   II-1
0084     56 0.000000 +-0.001830   BA   C  RS415   II-1
0084     80 0.000030 +-0.000050   HG   C  RS415   II-1
0084     82 0.000590 +-0.000120   PB   C  RS415   II-1
0085     16 0.243000 +-0.024300   S    C  SECONDARY SULFATE
0087     13 0.022800 +-0.020635  AL    ORCOM   WEIGHTED AVERAGE OF OR
0087     14 0.056269 +-0.043521  SI    ORCOM   WEIGHTED AVERAGE OF OR
0087     15 0.005386 +-0.001090  P     ORCOM   WEIGHTED AVERAGE OF OR
0087     16 0.123535 +-0.029800  S     ORCOM   WEIGHTED AVERAGE OF OR
0087     17 0.000000 +-0.000000  CL    ORCOM   WEIGHTED AVERAGE OF OR
0087     19 0.004861 +-0.005332  K     ORCOM   WEIGHTED AVERAGE OF OR
0087     20 0.018882 +-0.010992  CA    ORCOM   WEIGHTED AVERAGE OF OR
0087     22 0.001724 +-0.000931  TI    ORCOM   WEIGHTED AVERAGE OF OR
0087     23 0.000141 +-0.000109  V     ORCOM   WEIGHTED AVERAGE OF OR
0087     24 0.000306 +-0.000172  CR    ORCOM   WEIGHTED AVERAGE OF OR
0087     25 0.002060 +-0.003047  MN    ORCOM   WEIGHTED AVERAGE OF OR
0087     26 0.064483 +-0.055363  FE    ORCOM   WEIGHTED AVERAGE OF OR
0087     28 0.001021 +-0.000665  NI    ORCOM   WEIGHTED AVERAGE OF OR
0087     29 0.070876 +-0.057050  CU    ORCOM   WEIGHTED AVERAGE OF OR
0087     30 0.043005 +-0.032410  ZN    ORCOM   WEIGHTED AVERAGE OF OR
0087     33 0.036795 +-0.027447  AS    ORCOM   WEIGHTED AVERAGE OF OR
0087     34 0.000326 +-0.000214  SE    ORCOM   WEIGHTED AVERAGE OF OR
0087     35 0.003350 +-0.002195  BR    ORCOM   WEIGHTED AVERAGE OF OR
0087     38 0.000629 +-0.001542  SR    ORCOM   WEIGHTED AVERAGE OF OR
0087     46 0.001281 +-0.001603  PD    ORCOM   WEIGHTED AVERAGE OF OR
0087     47 0.005933 +-0.006221  AG    ORCOM   WEIGHTED AVERAGE OF OR
0087     48 0.003930 +-0.003700  CD    ORCOM   WEIGHTED AVERAGE OF OR
0087     49 0.000550 +-0.000173  IN    ORCOM   WEIGHTED AVERAGE OF OR
0087     50 0.003847 +-0.002142  SN    ORCOM   WEIGHTED AVERAGE OF OR
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0087     51 0.045932 +-0.042459  SB    ORCOM  WEIGHTED AVERAGE OF ORE
0087     56 0.002662 +-0.004494  BA    ORCOM  WEIGHTED AVERAGE OF ORE
0087     80 0.000259 +-0.000196  HG    ORCOM  WEIGHTED AVERAGE OF ORE
0087     82 0.243652 +-0.149603  PB    ORCOM  WEIGHTED AVERAGE OF ORE
0088     13 0.000480 +-0.000060  AL  F   HD524  WOOD STOVE
0088     14 0.000310 +-0.000040  SI  F   HD524  WOOD STOVE
0088     15 0.000350 +-0.000030  P   F   HD524  WOOD STOVE
0088     16 0.001440 +-0.000110  S   F   HD524  WOOD STOVE
0088     17 0.000520 +-0.000050  CL  F   HD524  WOOD STOVE
0088     19 0.003220 +-0.000170  K   F   HD524  WOOD STOVE
0088     20 0.000210 +-0.000020  CA  F   HD524  WOOD STOVE
0088     22 0.000010 +-0.000010  TI  F   HD524  WOOD STOVE
0088     23 0.000000 +-0.000010  V   F   HD524  WOOD STOVE
0088     24 0.000000 +-0.000010  CR  F   HD524  WOOD STOVE
0088     25 0.000000 +-0.000010  MN  F   HD524  WOOD STOVE
0088     26 0.000000 +-0.000010  FE  F   HD524  WOOD STOVE
0088     28 0.000000 +-0.000010  NI  F   HD524  WOOD STOVE
0088     29 0.000000 +-0.000010  CU  F   HD524  WOOD STOVE
0088     30 0.000290 +-0.000020  ZN  F   HD524  WOOD STOVE
0088     33 0.000060 +-0.000010  AS  F   HD524  WOOD STOVE
0088     34 0.000010 +-0.000010  SE  F   HD524  WOOD STOVE
0088     35 0.000030 +-0.000010  BR  F   HD524  WOOD STOVE
0088     38 0.000000 +-0.000010  SR  F   HD524  WOOD STOVE
0088     46 0.000000 +-0.000020  PD  F   HD524  WOOD STOVE
0088     47 0.000000 +-0.000040  AG  F   HD524  WOOD STOVE
0088     48 0.000000 +-0.000050  CD  F   HD524  WOOD STOVE
0088     49 0.000000 +-0.000060  IN  F   HD524  WOOD STOVE
0088     50 0.000000 +-0.000070  SN  F   HD524  WOOD STOVE
0088     51 0.000000 +-0.000110  SB  F   HD524  WOOD STOVE
0088     56 0.000000 +-0.000320  BA  F   HD524  WOOD STOVE
0088     80 0.000010 +-0.000010  HG  F   HD524  WOOD STOVE
0088     82 0.000020 +-0.000020  PB  F   HD524  WOOD STOVE
```

Appendix F

Source Elemental Compositions - Coarse Fraction

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USER: E400

SORC

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MMMMM M      MMM   MMM
M     M  M  M   M M   M
M     M  M  M   M M   M
MMMM  MMMMM M M M M M M
M        M  M   M M   M
M        M  M   M M   M
MMMMM    M   MMM   MMM


 MMM   MMM  MMMM   MMM
M   M M   M M   M M   M
M     M   M M   M M
 MMM  M   M MMMM  M
    M M   M M M   M
M   M M   M M  M  M   M
 MMM   MMM  M   M  MMM


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LABEL:  PRT002  -FORM        -COPIES   1

SPOOLED:  08/27/82 11:33
STARTED:  08/27/82 11:34, ON: CE2P  BY: Q
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0004     82  .167700 +- .031500 PB   FN FRAC TRANSPORTATION
0004     35  .065400 +- .026000 BR   FN FRAC TRANSPORTATION
0004     13  .004600 +- .002390 AL   FN FRAC TRANSPORTATION
0004     14  .009880 +- .004060 SI   FN FRAC TRANSPORTATION
0004     17  .011000 +- .004200 CL   FN FRAC TRANSPORTATION
0004     20  .019160 +- .008660 CA   FN FRAC TRANSPORTATION
0004     22  .000000 +- .000070 TI   FN FRAC TRANSPORTATION
0004     26  .005480 +- .002350 FE   FN FRAC TRANSPORTATION
0004     16  .010400 +- .003800 S    FN FRAC TRANSPORTATION
0004     30  .003500 +- .001300 ZN   FN FRAC TRANSPORTATION
0004     19  .002660 +- .001180 K    FN FRAC TRANSPORTATION
0004     25  .001180 +- .000510 MN   FN FRAC TRANSPORTATION
0004     28  .000760 +- .000080 NI   FN FRAC TRANSPORTATION
0004     29  .000590 +- .000270 CU   FN FRAC TRANSPORTATION
0005     19  .002800 +- .001000 K    FN FRAC RESID OIL COMB
0005     16  .133000 +- .024000 S    FN FRAC RESID OIL COMB
0005     17  .000000 +- .001000 CL   FN FRAC RESID OIL COMB
0005     13  .005300 +- .002400 AL   FN FRAC RESID OIL COMB
0005     14  .009600 +- .004800 SI   FN FRAC RESID OIL COMB
0005     20  .015800 +- .006400 CA   FN FRAC RESID OIL COMB
0005     22  .001100 +- .000380 TI   FN FRAC RESID OIL COMB
0005     23  .034400 +- .007500 V    FN FRAC RESID OIL COMB
0005     24  .000470 +- .000150 CR   FN FRAC RESID OIL COMB
0005     25  .000460 +- .000130 MN   FN FRAC RESID OIL COMB
0005     26  .029700 +- .006100 FE   FN FRAC RESID OIL COMB
0005     28  .053600 +- .012100 NI   FN FRAC RESID OIL COMB
0005     29  .000750 +- .000250 CU   FN FRAC RESID OIL COMB
0005     30  .004000 +- .001800 ZN   FN FRAC RESID OIL COMB
0005     35  .000130 +- .000210 BR   FN FRAC RESID OIL COMB
0005     82  .001100 +- .000640 PB   FN FRAC RESID OIL COMB
0011     13 0.095420 +-0.009542   AL   C   RS556    COMPOSITE A
0011     14 0.335770 +-0.033577   SI   C   RS556    COMPOSITE A
0011     15 0.001840 +-0.000184   P    C   RS556    COMPOSITE A
0011     16 0.002050 +-0.000205   S    C   RS556    COMPOSITE A
0011     17 0.001030 +-0.000103   CL   C   RS556    COMPOSITE A
0011     19 0.019630 +-0.001963   K    C   RS556    COMPOSITE A
0011     20 0.019610 +-0.001961   CA   C   RS556    COMPOSITE A
0011     22 0.004600 +-0.000460   TI   C   RS556    COMPOSITE A
0011     23 0.000230 +-0.000023   V    C   RS556    COMPOSITE A
0011     24 0.000220 +-0.000022   CR   C   RS556    COMPOSITE A
0011     25 0.000760 +-0.000076   MN   C   RS556    COMPOSITE A
0011     26 0.038870 +-0.003887   FE   C   RS556    COMPOSITE A
0011     28 0.000050 +-0.000010   NI   C   RS556    COMPOSITE A
0011     29 0.000160 +-0.000016   CU   C   RS556    COMPOSITE A
0011     30 0.000500 +-0.000050   ZN   C   RS556    COMPOSITE A
0011     33 0.000060 +-0.000020   AS   C   RS556    COMPOSITE A
0011     34 0.000000 +-0.000001   SE   C   RS556    COMPOSITE A
0011     35 0.000020 +-0.000010   BR   C   RS556    COMPOSITE A
0011     38 0.000150 +-0.000015   SR   C   RS556    COMPOSITE A
0011     46 0.000020 +-0.000030   PD   C   RS556    COMPOSITE A
0011     47 0.000000 +-0.000040   AG   C   RS556    COMPOSITE A
0011     48 0.000000 +-0.000060   CD   C   RS556    COMPOSITE A
0011     49 0.000000 +-0.000070   IN   C   RS556    COMPOSITE A
0011     50 0.000110 +-0.000070   SN   C   RS556    COMPOSITE A
0011     51 0.000140 +-0.000130   SB   C   RS556    COMPOSITE A
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0011     56 0.000520 +-0.000370    BA   C   RS556     COMPOSITE A
0011     80 0.000010 +-0.000010    HG   C   RS556     COMPOSITE A
0011     82 0.000500 +-0.000050    PB   C   RS556     COMPOSITE A
0012     13 0.052240 +-0.005224    AL   C   RS562     COMPOSITE B
0012     14 0.210220 +-0.021022    SI   C   RS562     COMPOSITE B
0012     15 0.001010 +-0.000101    P    C   RS562     COMPOSITE B
0012     16 0.002970 +-0.000297    S    C   RS562     COMPOSITE B
0012     17 0.001650 +-0.000165    CL   C   RS562     COMPOSITE B
0012     19 0.018200 +-0.001820    K    C   RS562     COMPOSITE B
0012     20 0.080830 +-0.008083    CA   C   RS562     COMPOSITE B
0012     22 0.002740 +-0.000274    TI   C   RS562     COMPOSITE B
0012     23 0.000160 +-0.000016    V    C   RS562     COMPOSITE B
0012     24 0.000120 +-0.000012    CR   C   RS562     COMPOSITE B
0012     25 0.000490 +-0.000049    MN   C   RS562     COMPOSITE B
0012     26 0.020830 +-0.002083    FE   C   RS562     COMPOSITE B
0012     28 0.000040 +-0.000010    NI   C   RS562     COMPOSITE B
0012     29 0.000060 +-0.000010    CU   C   RS562     COMPOSITE B
0012     30 0.000310 +-0.000031    ZN   C   RS562     COMPOSITE B
0012     33 0.000000 +-0.000020    AS   C   RS562     COMPOSITE B
0012     34 0.000010 +-0.000001    SE   C   RS562     COMPOSITE B
0012     35 0.000020 +-0.000002    BR   C   RS562     COMPOSITE B
0012     38 0.000100 +-0.000010    SR   C   RS562     COMPOSITE B
0012     46 0.000040 +-0.000020    PD   C   RS562     COMPOSITE B
0012     47 0.000000 +-0.000030    AG   C   RS562     COMPOSITE B
0012     48 0.000030 +-0.000040    CD   C   RS562     COMPOSITE B
0012     49 0.000000 +-0.000050    IN   C   RS562     COMPOSITE B
0012     50 0.000000 +-0.000050    SN   C   RS562     COMPOSITE B
0012     51 0.000000 +-0.000090    SB   C   RS562     COMPOSITE B
0012     56 0.000090 +-0.000260    BA   C   RS562     COMPOSITE B
0012     80 0.000020 +-0.000010    HG   C   RS562     COMPOSITE B
0012     82 0.000550 +-0.000055    PB   C   RS562     COMPOSITE B
0013     13 0.075980 +-0.007598    AL   C   RS560     COMPOSITE C
0013     14 0.276000 +-0.027600    SI   C   RS560     COMPOSITE C
0013     15 0.001750 +-0.000175    P    C   RS560     COMPOSITE C
0013     16 0.002760 +-0.000276    S    C   RS560     COMPOSITE C
0013     17 0.001360 +-0.000136    CL   C   RS560     COMPOSITE C
0013     19 0.016770 +-0.001677    K    C   RS560     COMPOSITE C
0013     20 0.053020 +-0.005302    CA   C   RS560     COMPOSITE C
0013     22 0.003930 +-0.000393    TI   C   RS560     COMPOSITE C
0013     23 0.000200 +-0.000020    V    C   RS560     COMPOSITE C
0013     24 0.000210 +-0.000021    CR   C   RS560     COMPOSITE C
0013     25 0.000930 +-0.000093    MN   C   RS560     COMPOSITE C
0013     26 0.034340 +-0.003434    FE   C   RS560     COMPOSITE C
0013     28 0.000040 +-0.000010    NI   C   RS560     COMPOSITE C
0013     29 0.000170 +-0.000017    CU   C   RS560     COMPOSITE C
0013     30 0.000700 +-0.000070    ZN   C   RS560     COMPOSITE C
0013     33 0.000200 +-0.000030    AS   C   RS560     COMPOSITE C
0013     34 0.000010 +-0.000010    SE   C   RS560     COMPOSITE C
0013     35 0.000040 +-0.000010    BR   C   RS560     COMPOSITE C
0013     38 0.000190 +-0.000019    SR   C   RS560     COMPOSITE C
0013     46 0.000000 +-0.000030    PD   C   RS560     COMPOSITE C
0013     47 0.000000 +-0.000040    AG   C   RS560     COMPOSITE C
0013     48 0.000110 +-0.000070    CD   C   RS560     COMPOSITE C
0013     49 0.000020 +-0.000070    IN   C   RS560     COMPOSITE C
0013     50 0.000050 +-0.000080    SN   C   RS560     COMPOSITE C
0013     51 0.000200 +-0.000140    SB   C   RS560     COMPOSITE C
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0013     56 0.000410 +-0.000380   BA   C   RS560    COMPOSITE C
0013     80 0.000030 +-0.000010   HG   C   RS560    COMPOSITE C
0013     82 0.001720 +-0.000172   PB   C   RS560    COMPOSITE C
0014     13 0.098400 +-0.009840   AL   C   RS453   COMPOSITE D
0014     14 0.358590 +-0.035859   SI   C   RS453   COMPOSITE D
0014     15 0.002610 +-0.000261   P    C   RS453   COMPOSITE D
0014     16 0.003770 +-0.000470   S    C   RS453   COMPOSITE D
0014     17 0.000780 +-0.000100   CL   C   RS453   COMPOSITE D
0014     19 0.019540 +-0.001954   K    C   RS453   COMPOSITE D
0014     20 0.007910 +-0.000791   CA   C   RS453   COMPOSITE D
0014     22 0.005580 +-0.000558   TI   C   RS453   COMPOSITE D
0014     23 0.000300 +-0.000030   V    C   RS453   COMPOSITE D
0014     24 0.000220 +-0.000022   CR   C   RS453   COMPOSITE D
0014     25 0.000940 +-0.000094   MN   C   RS453   COMPOSITE D
0014     26 0.049000 +-0.004900   FE   C   RS453   COMPOSITE D
0014     28 0.000040 +-0.000010   NI   C   RS453   COMPOSITE D
0014     29 0.001520 +-0.000152   CU   C   RS453   COMPOSITE D
0014     30 0.002140 +-0.000214   ZN   C   RS453   COMPOSITE D
0014     33 0.000840 +-0.000100   AS   C   RS453   COMPOSITE D
0014     34 0.000020 +-0.000010   SE   C   RS453   COMPOSITE D
0014     35 0.000120 +-0.000012   BR   C   RS453   COMPOSITE D
0014     38 0.000140 +-0.000020   SR   C   RS453   COMPOSITE D
0014     46 0.000060 +-0.000040   PD   C   RS453   COMPOSITE D
0014     47 0.000000 +-0.000060   AG   C   RS453   COMPOSITE D
0014     48 0.000260 +-0.000090   CD   C   RS453   COMPOSITE D
0014     49 0.000000 +-0.000100   IN   C   RS453   COMPOSITE D
0014     50 0.000010 +-0.000120   SN   C   RS453   COMPOSITE D
0014     51 0.000000 +-0.000210   SB   C   RS453   COMPOSITE D
0014     56 0.000700 +-0.000570   BA   C   RS453   COMPOSITE D
0014     80 0.000060 +-0.000020   HG   C   RS453   COMPOSITE D
0014     82 0.008790 +-0.000879   PB   C   RS453   COMPOSITE D
0015     13 0.075990 +-0.007599   AL   C   RS425   COMPOSITE E
0015     14 0.278590 +-0.027859   SI   C   RS425   COMPOSITE E
0015     15 0.002270 +-0.000227   P    C   RS425   COMPOSITE E
0015     16 0.004700 +-0.000550   S    C   RS425   COMPOSITE E
0015     17 0.000990 +-0.000160   CL   C   RS425   COMPOSITE E
0015     19 0.015510 +-0.001551   K    C   RS425   COMPOSITE E
0015     20 0.026850 +-0.002685   CA   C   RS425   COMPOSITE E
0015     22 0.003760 +-0.000376   TI   C   RS425   COMPOSITE E
0015     23 0.000260 +-0.000040   V    C   RS425   COMPOSITE E
0015     24 0.000190 +-0.000020   CR   C   RS425   COMPOSITE E
0015     25 0.000880 +-0.000088   MN   C   RS425   COMPOSITE E
0015     26 0.034370 +-0.003437   FE   C   RS425   COMPOSITE E
0015     28 0.000090 +-0.000020   NI   C   RS425   COMPOSITE E
0015     29 0.006010 +-0.000601   CU   C   RS425   COMPOSITE E
0015     30 0.005160 +-0.000516   ZN   C   RS425   COMPOSITE E
0015     33 0.000490 +-0.000120   AS   C   RS425   COMPOSITE E
0015     34 0.000030 +-0.000020   SE   C   RS425   COMPOSITE E
0015     35 0.000100 +-0.000020   BR   C   RS425   COMPOSITE E
0015     38 0.000230 +-0.000030   SR   C   RS425   COMPOSITE E
0015     46 0.000000 +-0.000090   PD   C   RS425   COMPOSITE E
0015     47 0.000000 +-0.000110   AG   C   RS425   COMPOSITE E
0015     48 0.000000 +-0.000180   CD   C   RS425   COMPOSITE E
0015     49 0.000000 +-0.000180   IN   C   RS425   COMPOSITE E
0015     50 0.000380 +-0.000200   SN   C   RS425   COMPOSITE E
0015     51 0.000030 +-0.000390   SB   C   RS425   COMPOSITE E
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0015      56 0.000420 +-0.001040   BA   C   RS425   COMPOSITE E
0015      80 0.000010 +-0.000030   HG   C   RS425   COMPOSITE E
0015      82 0.007710 +-0.000771   PB   C   RS425   COMPOSITE E
0016      13 0.090220 +-0.009022   AL   C   RS455   COMPOSITE F
0016      14 0.303210 +-0.030321   SI   C   RS455   COMPOSITE F
0016      15 0.002410 +-0.000241   P    C   RS455   COMPOSITE F
0016      16 0.005860 +-0.000586   S    C   RS455   COMPOSITE F
0016      17 0.002060 +-0.000206   CL   C   RS455   COMPOSITE F
0016      19 0.019370 +-0.001937   K    C   RS455   COMPOSITE F
0016      20 0.023000 +-0.002300   CA   C   RS455   COMPOSITE F
0016      22 0.005120 +-0.000512   TI   C   RS455   COMPOSITE F
0016      23 0.000290 +-0.000030   V    C   RS455   COMPOSITE F
0016      24 0.000240 +-0.000024   CR   C   RS455   COMPOSITE F
0016      25 0.002350 +-0.000235   MN   C   RS455   COMPOSITE F
0016      26 0.053380 +-0.005338   FE   C   RS455   COMPOSITE F
0016      28 0.000080 +-0.000010   NI   C   RS455   COMPOSITE F
0016      29 0.001680 +-0.000168   CU   C   RS455   COMPOSITE F
0016      30 0.002550 +-0.000255   ZN   C   RS455   COMPOSITE F
0016      33 0.000450 +-0.000060   AS   C   RS455   COMPOSITE F
0016      34 0.000010 +-0.000010   SE   C   RS455   COMPOSITE F
0016      35 0.000080 +-0.000010   BR   C   RS455   COMPOSITE F
0016      38 0.000280 +-0.000028   SR   C   RS455   COMPOSITE F
0016      46 0.000010 +-0.000030   PD   C   RS455   COMPOSITE F
0016      47 0.000010 +-0.000050   AG   C   RS455   COMPOSITE F
0016      48 0.000260 +-0.000080   CD   C   RS455   COMPOSITE F
0016      49 0.000000 +-0.000090   IN   C   RS455   COMPOSITE F
0016      50 0.000120 +-0.000100   SN   C   RS455   COMPOSITE F
0016      51 0.000210 +-0.000190   SB   C   RS455   COMPOSITE F
0016      56 0.000930 +-0.000500   BA   C   RS455   COMPOSITE F
0016      80 0.000020 +-0.000020   HG   C   RS455   COMPOSITE F
0016      82 0.004030 +-0.000403   PB   C   RS455   COMPOSITE F
0017      13 0.063120 +-0.006312   AL   C   RS427   COMPOSITE G
0017      14 0.182850 +-0.018285   SI   C   RS427   COMPOSITE G
0017      15 0.002360 +-0.000236   P    C   RS427   COMPOSITE G
0017      16 0.010210 +-0.001021   S    C   RS427   COMPOSITE G
0017      17 0.000950 +-0.000150   CL   C   RS427   COMPOSITE G
0017      19 0.011360 +-0.001136   K    C   RS427   COMPOSITE G
0017      20 0.036790 +-0.003679   CA   C   RS427   COMPOSITE G
0017      22 0.002820 +-0.000282   TI   C   RS427   COMPOSITE G
0017      23 0.000250 +-0.000030   V    C   RS427   COMPOSITE G
0017      24 0.000320 +-0.000032   CR   C   RS427   COMPOSITE G
0017      25 0.000960 +-0.000096   MN   C   RS427   COMPOSITE G
0017      26 0.074910 +-0.007491   FE   C   RS427   COMPOSITE G
0017      28 0.000210 +-0.000030   NI   C   RS427   COMPOSITE G
0017      29 0.029360 +-0.002936   CU   C   RS427   COMPOSITE G
0017      30 0.011380 +-0.001138   ZN   C   RS427   COMPOSITE G
0017      33 0.000630 +-0.000120   AS   C   RS427   COMPOSITE G
0017      34 0.000030 +-0.000010   SE   C   RS427   COMPOSITE G
0017      35 0.000110 +-0.000020   BR   C   RS427   COMPOSITE G
0017      38 0.000270 +-0.000030   SR   C   RS427   COMPOSITE G
0017      46 0.000060 +-0.000080   PD   C   RS427   COMPOSITE G
0017      47 0.000300 +-0.000120   AG   C   RS427   COMPOSITE G
0017      48 0.000290 +-0.000170   CD   C   RS427   COMPOSITE G
0017      49 0.000000 +-0.000170   IN   C   RS427   COMPOSITE G
0017      50 0.000000 +-0.000200   SN   C   RS427   COMPOSITE G
0017      51 0.000000 +-0.000390   SB   C   RS427   COMPOSITE G
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0017      56 0.000000 +-0.001020   BA   C   RS427   COMPOSITE G
0017      80 0.000050 +-0.000030   HG   C   RS427   COMPOSITE G
0017      82 0.007870 +-0.000787   PB   C   RS427   COMPOSITE G
0018      13 0.070330 +-0.007033   AL   C   RS429   COMPOSITE H
0018      14 0.245100 +-0.024510   SI   C   RS429   COMPOSITE H
0018      15 0.002400 +-0.000240   P    C   RS429   COMPOSITE H
0018      16 0.009220 +-0.000922   S    C   RS429   COMPOSITE H
0018      17 0.001270 +-0.000140   CL   C   RS429   COMPOSITE H
0018      19 0.016320 +-0.001632   K    C   RS429   COMPOSITE H
0018      20 0.028660 +-0.002866   CA   C   RS429   COMPOSITE H
0018      22 0.004630 +-0.000463   TI   C   RS429   COMPOSITE H
0018      23 0.000270 +-0.000030   V    C   RS429   COMPOSITE H
0018      24 0.000250 +-0.000025   CR   C   RS429   COMPOSITE H
0018      25 0.000820 +-0.000082   MN   C   RS429   COMPOSITE H
0018      26 0.043610 +-0.004361   FE   C   RS429   COMPOSITE H
0018      28 0.000100 +-0.000020   NI   C   RS429   COMPOSITE H
0018      29 0.005780 +-0.000578   CU   C   RS429   COMPOSITE H
0018      30 0.003030 +-0.000303   ZN   C   RS429   COMPOSITE H
0018      33 0.000130 +-0.000060   AS   C   RS429   COMPOSITE H
0018      34 0.000010 +-0.000010   SE   C   RS429   COMPOSITE H
0018      35 0.000100 +-0.000020   BR   C   RS429   COMPOSITE H
0018      38 0.000260 +-0.000030   SR   C   RS429   COMPOSITE H
0018      46 0.000030 +-0.000060   PD   C   RS429   COMPOSITE H
0018      47 0.000100 +-0.000080   AG   C   RS429   COMPOSITE H
0018      48 0.000140 +-0.000120   CD   C   RS429   COMPOSITE H
0018      49 0.000020 +-0.000130   IN   C   RS429   COMPOSITE H
0018      50 0.000000 +-0.000150   SN   C   RS429   COMPOSITE H
0018      51 0.000000 +-0.000300   SB   C   RS429   COMPOSITE H
0018      56 0.000390 +-0.000790   BA   C   RS429   COMPOSITE H
0018      80 0.000000 +-0.000020   HG   C   RS429   COMPOSITE H
0018      82 0.003110 +-0.000311   PB   C   RS429   COMPOSITE H
0019      13 0.093470 +-0.009347   AL   C   RS554    COMPOSITE I
0019      14 0.293700 +-0.029370   SI   C   RS554    COMPOSITE I
0019      15 0.001490 +-0.000149   P    C   RS554    COMPOSITE I
0019      16 0.002480 +-0.000248   S    C   RS554    COMPOSITE I
0019      17 0.001130 +-0.000113   CL   C   RS554    COMPOSITE I
0019      19 0.021390 +-0.002139   K    C   RS554    COMPOSITE I
0019      20 0.039940 +-0.003994   CA   C   RS554    COMPOSITE I
0019      22 0.004330 +-0.000433   TI   C   RS554    COMPOSITE I
0019      23 0.000160 +-0.000050   V    C   RS554    COMPOSITE I
0019      24 0.000190 +-0.000020   CR   C   RS554    COMPOSITE I
0019      25 0.000400 +-0.000040   MN   C   RS554    COMPOSITE I
0019      26 0.021580 +-0.002158   FE   C   RS554    COMPOSITE I
0019      28 0.000050 +-0.000010   NI   C   RS554    COMPOSITE I
0019      29 0.000140 +-0.000014   CU   C   RS554    COMPOSITE I
0019      30 0.000300 +-0.000030   ZN   C   RS554    COMPOSITE I
0019      33 0.000020 +-0.000020   AS   C   RS554    COMPOSITE I
0019      34 0.000000 +-0.000010   SE   C   RS554    COMPOSITE I
0019      35 0.000020 +-0.000010   BR   C   RS554    COMPOSITE I
0019      38 0.000330 +-0.000033   SR   C   RS554    COMPOSITE I
0019      46 0.000000 +-0.000030   PD   C   RS554    COMPOSITE I
0019      47 0.000020 +-0.000040   AG   C   RS554    COMPOSITE I
0019      48 0.000090 +-0.000070   CD   C   RS554    COMPOSITE I
0019      49 0.000000 +-0.000070   IN   C   RS554    COMPOSITE I
0019      50 0.000010 +-0.000080   SN   C   RS554    COMPOSITE I
0019      51 0.000090 +-0.000140   SB   C   RS554    COMPOSITE I
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0019      56 0.003060 +-0.000470   BA  C  RS554   COMPOSITE I
0019      80 0.000000 +-0.000010   HG  C  RS554   COMPOSITE I
0019      82 0.000270 +-0.000030   PB  C  RS554   COMPOSITE I
0020      13 0.074150 +-0.007415   AL  C  RS457  COMPOSITE J
0020      14 0.252990 +-0.025299   SI  C  RS457  COMPOSITE J
0020      15 0.002170 +-0.000217   P   C  RS457  COMPOSITE J
0020      16 0.013100 +-0.001310   S   C  RS457  COMPOSITE J
0020      17 0.001340 +-0.000170   CL  C  RS457  COMPOSITE J
0020      19 0.017240 +-0.001724   K   C  RS457  COMPOSITE J
0020      20 0.069730 +-0.006973   CA  C  RS457  COMPOSITE J
0020      22 0.003970 +-0.000397   TI  C  RS457  COMPOSITE J
0020      23 0.000240 +-0.000030   V   C  RS457  COMPOSITE J
0020      24 0.000240 +-0.000024   CR  C  RS457  COMPOSITE J
0020      25 0.001370 +-0.000137   MN  C  RS457  COMPOSITE J
0020      26 0.043410 +-0.004341   FE  C  RS457  COMPOSITE J
0020      28 0.000140 +-0.000020   NI  C  RS457  COMPOSITE J
0020      29 0.005070 +-0.000507   CU  C  RS457  COMPOSITE J
0020      30 0.008410 +-0.000841   ZN  C  RS457  COMPOSITE J
0020      33 0.002120 +-0.000212   AS  C  RS457  COMPOSITE J
0020      34 0.000090 +-0.000020   SE  C  RS457  COMPOSITE J
0020      35 0.000290 +-0.000030   BR  C  RS457  COMPOSITE J
0020      38 0.000350 +-0.000035   SR  C  RS457  COMPOSITE J
0020      46 0.000070 +-0.000050   PD  C  RS457  COMPOSITE J
0020      47 0.000110 +-0.000090   AG  C  RS457  COMPOSITE J
0020      48 0.000900 +-0.000150   CD  C  RS457  COMPOSITE J
0020      49 0.000000 +-0.000140   IN  C  RS457  COMPOSITE J
0020      50 0.000340 +-0.000160   SN  C  RS457  COMPOSITE J
0020      51 0.000820 +-0.000310   SB  C  RS457  COMPOSITE J
0020      56 0.000760 +-0.000740   BA  C  RS457  COMPOSITE J
0020      80 0.000040 +-0.000030   HG  C  RS457  COMPOSITE J
0020      82 0.019090 +-0.001909   PB  C  RS457  COMPOSITE J
0021      13 0.066110 +-0.006611   AL  C  RS459  COMPOSITE K
0021      14 0.229950 +-0.022995   SI  C  RS459  COMPOSITE K
0021      15 0.002070 +-0.000207   P   C  RS459  COMPOSITE K
0021      16 0.017850 +-0.001785   S   C  RS459  COMPOSITE K
0021      17 0.000420 +-0.000190   CL  C  RS459  COMPOSITE K
0021      19 0.014890 +-0.001489   K   C  RS459  COMPOSITE K
0021      20 0.052270 +-0.005227   CA  C  RS459  COMPOSITE K
0021      22 0.003670 +-0.000367   TI  C  RS459  COMPOSITE K
0021      23 0.000220 +-0.000030   V   C  RS459  COMPOSITE K
0021      24 0.000240 +-0.000030   CR  C  RS459  COMPOSITE K
0021      25 0.001540 +-0.000154   MN  C  RS459  COMPOSITE K
0021      26 0.044800 +-0.004480   FE  C  RS459  COMPOSITE K
0021      28 0.000330 +-0.000033   NI  C  RS459  COMPOSITE K
0021      29 0.038550 +-0.003855   CU  C  RS459  COMPOSITE K
0021      30 0.018960 +-0.001896   ZN  C  RS459  COMPOSITE K
0021      33 0.003200 +-0.000320   AS  C  RS459  COMPOSITE K
0021      34 0.000060 +-0.000020   SE  C  RS459  COMPOSITE K
0021      35 0.000360 +-0.000036   BR  C  RS459  COMPOSITE K
0021      38 0.000390 +-0.000039   SR  C  RS459  COMPOSITE K
0021      46 0.000090 +-0.000060   PD  C  RS459  COMPOSITE K
0021      47 0.000300 +-0.000110   AG  C  RS459  COMPOSITE K
0021      48 0.001460 +-0.000190   CD  C  RS459  COMPOSITE K
0021      49 0.000000 +-0.000160   IN  C  RS459  COMPOSITE K
0021      50 0.000630 +-0.000190   SN  C  RS459  COMPOSITE K
0021      51 0.001570 +-0.000380   SB  C  RS459  COMPOSITE K
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0021      56 0.000000 +-0.000830   BA   C   RS459   COMPOSITE K
0021      80 0.000050 +-0.000040   HG   C   RS459   COMPOSITE K
0021      82 0.030460 +-0.003046   PB   C   RS459   COMPOSITE K
0022      13 0.084350 +-0.008435   AL   C   RS461   COMPOSITE L
0022      14 0.282360 +-0.028236   SI   C   RS461   COMPOSITE L
0022      15 0.002260 +-0.000226   P    C   RS461   COMPOSITE L
0022      16 0.012740 +-0.001274   S    C   RS461   COMPOSITE L
0022      17 0.000920 +-0.000150   CL   C   RS461   COMPOSITE L
0022      19 0.019720 +-0.001972   K    C   RS461   COMPOSITE L
0022      20 0.033980 +-0.003398   CA   C   RS461   COMPOSITE L
0022      22 0.004480 +-0.000448   TI   C   RS461   COMPOSITE L
0022      23 0.000250 +-0.000030   V    C   RS461   COMPOSITE L
0022      24 0.000320 +-0.000032   CR   C   RS461   COMPOSITE L
0022      25 0.001420 +-0.000142   MN   C   RS461   COMPOSITE L
0022      26 0.051990 +-0.005199   FE   C   RS461   COMPOSITE L
0022      28 0.000230 +-0.000023   NI   C   RS461   COMPOSITE L
0022      29 0.016250 +-0.001625   CU   C   RS461   COMPOSITE L
0022      30 0.012550 +-0.001255   ZN   C   RS461   COMPOSITE L
0022      33 0.001860 +-0.000186   AS   C   RS461   COMPOSITE L
0022      34 0.000050 +-0.000010   SE   C   RS461   COMPOSITE L
0022      35 0.000220 +-0.000022   BR   C   RS461   COMPOSITE L
0022      38 0.000420 +-0.000042   SR   C   RS461   COMPOSITE L
0022      46 0.000000 +-0.000050   PD   C   RS461   COMPOSITE L
0022      47 0.000210 +-0.000090   AG   C   RS461   COMPOSITE L
0022      48 0.000550 +-0.000150   CD   C   RS461   COMPOSITE L
0022      49 0.000000 +-0.000130   IN   C   RS461   COMPOSITE L
0022      50 0.000520 +-0.000160   SN   C   RS461   COMPOSITE L
0022      51 0.000870 +-0.000330   SB   C   RS461   COMPOSITE L
0022      56 0.000000 +-0.000740   BA   C   RS461   COMPOSITE L
0022      80 0.000070 +-0.000030   HG   C   RS461   COMPOSITE L
0022      82 0.017170 +-0.001717   PB   C   RS461   COMPOSITE L
0023      13 0.018250 +-0.001825   AL   C   RS435   COMPOSITE M
0023      14 0.056400 +-0.005640   SI   C   RS435   COMPOSITE M
0023      15 0.000320 +-0.000230   P    C   RS435   COMPOSITE M
0023      16 0.009620 +-0.000962   S    C   RS435   COMPOSITE M
0023      17 0.003160 +-0.000316   CL   C   RS435   COMPOSITE M
0023      19 0.008730 +-0.000873   K    C   RS435   COMPOSITE M
0023      20 0.254340 +-0.025434   CA   C   RS435   COMPOSITE M
0023      22 0.001090 +-0.000109   TI   C   RS435   COMPOSITE M
0023      23 0.000070 +-0.000010   V    C   RS435   COMPOSITE M
0023      24 0.000070 +-0.000010   CR   C   RS435   COMPOSITE M
0023      25 0.000490 +-0.000049   MN   C   RS435   COMPOSITE M
0023      26 0.012380 +-0.001238   FE   C   RS435   COMPOSITE M
0023      28 0.000070 +-0.000010   NI   C   RS435   COMPOSITE M
0023      29 0.001510 +-0.000151   CU   C   RS435   COMPOSITE M
0023      30 0.002450 +-0.000245   ZN   C   RS435   COMPOSITE M
0023      33 0.000730 +-0.000073   AS   C   RS435   COMPOSITE M
0023      34 0.000020 +-0.000002   SE   C   RS435   COMPOSITE M
0023      35 0.000100 +-0.000010   BR   C   RS435   COMPOSITE M
0023      38 0.000250 +-0.000025   SR   C   RS435   COMPOSITE M
0023      46 0.000050 +-0.000010   PD   C   RS435   COMPOSITE M
0023      47 0.000100 +-0.000020   AG   C   RS435   COMPOSITE M
0023      48 0.000260 +-0.000030   CD   C   RS435   COMPOSITE M
0023      49 0.000000 +-0.000030   IN   C   RS435   COMPOSITE M
0023      50 0.000040 +-0.000030   SN   C   RS435   COMPOSITE M
0023      51 0.000150 +-0.000070   SB   C   RS435   COMPOSITE M
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0023     56 0.000000 +-0.000170   BA  C  RS435  COMPOSITE M
0023     80 0.000030 +-0.000010   HG  C  RS435  COMPOSITE M
0023     82 0.008250 +-0.000825   PB  C  RS435  COMPOSITE M
0024     13 0.075820 +-0.007582   AL  C  RS437  COMPOSITE N
0024     14 0.272770 +-0.027277   SI  C  RS437  COMPOSITE N
0024     15 0.002060 +-0.000206   P   C  RS437  COMPOSITE N
0024     16 0.008240 +-0.000824   S   C  RS437  COMPOSITE N
0024     17 0.001110 +-0.000130   CL  C  RS437  COMPOSITE N
0024     19 0.016190 +-0.001619   K   C  RS437  COMPOSITE N
0024     20 0.039210 +-0.003921   CA  C  RS437  COMPOSITE N
0024     22 0.003940 +-0.000394   TI  C  RS437  COMPOSITE N
0024     23 0.000240 +-0.000030   V   C  RS437  COMPOSITE N
0024     24 0.000260 +-0.000026   CR  C  RS437  COMPOSITE N
0024     25 0.000950 +-0.000095   MN  C  RS437  COMPOSITE N
0024     26 0.040950 +-0.004095   FE  C  RS437  COMPOSITE N
0024     28 0.000130 +-0.000020   NI  C  RS437  COMPOSITE N
0024     29 0.002400 +-0.000240   CU  C  RS437  COMPOSITE N
0024     30 0.004020 +-0.000402   ZN  C  RS437  COMPOSITE N
0024     33 0.000790 +-0.000100   AS  C  RS437  COMPOSITE N
0024     34 0.000040 +-0.000010   SE  C  RS437  COMPOSITE N
0024     35 0.000140 +-0.000020   BR  C  RS437  COMPOSITE N
0024     38 0.000280 +-0.000028   SR  C  RS437  COMPOSITE N
0024     46 0.000060 +-0.000050   PD  C  RS437  COMPOSITE N
0024     47 0.000190 +-0.000070   AG  C  RS437  COMPOSITE N
0024     48 0.000380 +-0.000110   CD  C  RS437  COMPOSITE N
0024     49 0.000000 +-0.000110   IN  C  RS437  COMPOSITE N
0024     50 0.000080 +-0.000130   SN  C  RS437  COMPOSITE N
0024     51 0.000050 +-0.000260   SB  C  RS437  COMPOSITE N
0024     56 0.000280 +-0.000660   BA  C  RS437  COMPOSITE N
0024     80 0.000030 +-0.000020   HG  C  RS437  COMPOSITE N
0024     82 0.007960 +-0.000796   PB  C  RS437  COMPOSITE N
0025     13 0.050170 +-0.005017   AL  C  RS439  COMPOSITE O
0025     14 0.174070 +-0.017407   SI  C  RS439  COMPOSITE O
0025     15 0.002080 +-0.000208   P   C  RS439  COMPOSITE O
0025     16 0.024660 +-0.002480   S   C  RS439  COMPOSITE O
0025     17 0.000000 +-0.000180   CL  C  RS439  COMPOSITE O
0025     19 0.014590 +-0.001459   K   C  RS439  COMPOSITE O
0025     20 0.061190 +-0.006119   CA  C  RS439  COMPOSITE O
0025     22 0.002770 +-0.000277   TI  C  RS439  COMPOSITE O
0025     23 0.000250 +-0.000025   V   C  RS439  COMPOSITE O
0025     24 0.000260 +-0.000026   CR  C  RS439  COMPOSITE O
0025     25 0.002120 +-0.000212   MN  C  RS439  COMPOSITE O
0025     26 0.045980 +-0.004598   FE  C  RS439  COMPOSITE O
0025     28 0.000380 +-0.000038   NI  C  RS439  COMPOSITE O
0025     29 0.030020 +-0.003002   CU  C  RS439  COMPOSITE O
0025     30 0.023710 +-0.002371   ZN  C  RS439  COMPOSITE O
0025     33 0.006840 +-0.000684   AS  C  RS439  COMPOSITE O
0025     34 0.000190 +-0.000020   SE  C  RS439  COMPOSITE O
0025     35 0.000720 +-0.000072   BR  C  RS439  COMPOSITE O
0025     38 0.000660 +-0.000066   SR  C  RS439  COMPOSITE O
0025     46 0.000170 +-0.000030   PD  C  RS439  COMPOSITE O
0025     47 0.000690 +-0.000069   AG  C  RS439  COMPOSITE O
0025     48 0.002300 +-0.000230   CD  C  RS439  COMPOSITE O
0025     49 0.000080 +-0.000050   IN  C  RS439  COMPOSITE O
0025     50 0.000730 +-0.000073   SN  C  RS439  COMPOSITE O
0025     51 0.004240 +-0.000424   SB  C  RS439  COMPOSITE O
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0025      56 0.000320 +-0.000260   BA   C   RS439   COMPOSITE O
0025      80 0.000260 +-0.000030   HG   C   RS439   COMPOSITE O
0025      82 0.053440 +-0.005344   PB   C   RS439   COMPOSITE O
0026      13 0.094820 +-0.009482   AL   C   RS442   COMPOSITE P
0026      14 0.305350 +-0.030535   SI   C   RS442   COMPOSITE P
0026      15 0.002450 +-0.000245   P    C   RS442   COMPOSITE P
0026      16 0.010450 +-0.001045   S    C   RS442   COMPOSITE P
0026      17 0.001080 +-0.000170   CL   C   RS442   COMPOSITE P
0026      19 0.020010 +-0.002001   K    C   RS442   COMPOSITE P
0026      20 0.024590 +-0.002459   CA   C   RS442   COMPOSITE P
0026      22 0.004970 +-0.000497   TI   C   RS442   COMPOSITE P
0026      23 0.000360 +-0.000040   V    C   RS442   COMPOSITE P
0026      24 0.000270 +-0.000030   CR   C   RS442   COMPOSITE P
0026      25 0.001460 +-0.000146   MN   C   RS442   COMPOSITE P
0026      26 0.052860 +-0.005286   FE   C   RS442   COMPOSITE P
0026      28 0.000190 +-0.000030   NI   C   RS442   COMPOSITE P
0026      29 0.006680 +-0.000668   CU   C   RS442   COMPOSITE P
0026      30 0.009850 +-0.000985   ZN   C   RS442   COMPOSITE P
0026      33 0.001550 +-0.000170   AS   C   RS442   COMPOSITE P
0026      34 0.000040 +-0.000020   SE   C   RS442   COMPOSITE P
0026      35 0.000200 +-0.000020   BR   C   RS442   COMPOSITE P
0026      38 0.000380 +-0.000038   SR   C   RS442   COMPOSITE P
0026      46 0.000020 +-0.000080   PD   C   RS442   COMPOSITE P
0026      47 0.000100 +-0.000110   AG   C   RS442   COMPOSITE P
0026      48 0.000430 +-0.000180   CD   C   RS442   COMPOSITE P
0026      49 0.000000 +-0.000170   IN   C   RS442   COMPOSITE P
0026      50 0.000390 +-0.000200   SN   C   RS442   COMPOSITE P
0026      51 0.000240 +-0.000390   SB   C   RS442   COMPOSITE P
0026      56 0.000000 +-0.000990   BA   C   RS442   COMPOSITE P
0026      80 0.000060 +-0.000030   HG   C   RS442   COMPOSITE P
0026      82 0.014140 +-0.001414   PB   C   RS442   COMPOSITE P
0027      13 0.070340 +-0.007034   AL   C   RS444   COMPOSITE Q
0027      14 0.241410 +-0.024141   SI   C   RS444   COMPOSITE Q
0027      15 0.002160 +-0.000216   P    C   RS444   COMPOSITE Q
0027      16 0.012250 +-0.001225   S    C   RS444   COMPOSITE Q
0027      17 0.000640 +-0.000120   CL   C   RS444   COMPOSITE Q
0027      19 0.016660 +-0.001666   K    C   RS444   COMPOSITE Q
0027      20 0.052590 +-0.005259   CA   C   RS444   COMPOSITE Q
0027      22 0.004140 +-0.000414   TI   C   RS444   COMPOSITE Q
0027      23 0.000260 +-0.000026   V    C   RS444   COMPOSITE Q
0027      24 0.000290 +-0.000029   CR   C   RS444   COMPOSITE Q
0027      25 0.001510 +-0.000151   MN   C   RS444   COMPOSITE Q
0027      26 0.052950 +-0.005295   FE   C   RS444   COMPOSITE Q
0027      28 0.000210 +-0.000021   NI   C   RS444   COMPOSITE Q
0027      29 0.008680 +-0.000868   CU   C   RS444   COMPOSITE Q
0027      30 0.014320 +-0.001432   ZN   C   RS444   COMPOSITE Q
0027      33 0.002290 +-0.000229   AS   C   RS444   COMPOSITE Q
0027      34 0.000050 +-0.000010   SE   C   RS444   COMPOSITE Q
0027      35 0.000300 +-0.000030   BR   C   RS444   COMPOSITE Q
0027      38 0.000430 +-0.000043   SR   C   RS444   COMPOSITE Q
0027      46 0.000070 +-0.000030   PD   C   RS444   COMPOSITE Q
0027      47 0.000260 +-0.000050   AG   C   RS444   COMPOSITE Q
0027      48 0.000610 +-0.000090   CD   C   RS444   COMPOSITE Q
0027      49 0.000030 +-0.000070   IN   C   RS444   COMPOSITE Q
0027      50 0.000460 +-0.000090   SN   C   RS444   COMPOSITE Q
0027      51 0.000890 +-0.000190   SB   C   RS444   COMPOSITE Q
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0027    56 0.000000 +-0.000410   BA  C  RS444  COMPOSITE Q
0027    80 0.000060 +-0.000020   HG  C  RS444  COMPOSITE Q
0027    82 0.021570 +-0.002157   PB  C  RS444  COMPOSITE Q
0028    13 0.034570 +-0.003457   AL  C  RS446  COMPOSITE R
0028    14 0.118430 +-0.011843   SI  C  RS446  COMPOSITE R
0028    15 0.001400 +-0.000170   P   C  RS446  COMPOSITE R
0028    16 0.007850 +-0.000785   S   C  RS446  COMPOSITE R
0028    17 0.002110 +-0.000211   CL  C  RS446  COMPOSITE R
0028    19 0.012130 +-0.001213   K   C  RS446  COMPOSITE R
0028    20 0.166310 +-0.016631   CA  C  RS446  COMPOSITE R
0028    22 0.002310 +-0.000231   TI  C  RS446  COMPOSITE R
0028    23 0.000150 +-0.000015   V   C  RS446  COMPOSITE R
0028    24 0.000130 +-0.000013   CR  C  RS446  COMPOSITE R
0028    25 0.000690 +-0.000069   MN  C  RS446  COMPOSITE R
0028    26 0.024200 +-0.002420   FE  C  RS446  COMPOSITE R
0028    28 0.000080 +-0.000010   NI  C  RS446  COMPOSITE R
0028    29 0.001460 +-0.000146   CU  C  RS446  COMPOSITE R
0028    30 0.003520 +-0.000352   ZN  C  RS446  COMPOSITE R
0028    33 0.000750 +-0.000075   AS  C  RS446  COMPOSITE R
0028    34 0.000040 +-0.000010   SE  C  RS446  COMPOSITE R
0028    35 0.000110 +-0.000011   BR  C  RS446  COMPOSITE R
0028    38 0.000260 +-0.000026   SR  C  RS446  COMPOSITE R
0028    46 0.000040 +-0.000020   PD  C  RS446  COMPOSITE R
0028    47 0.000080 +-0.000020   AG  C  RS446  COMPOSITE R
0028    48 0.000370 +-0.000050   CD  C  RS446  COMPOSITE R
0028    49 0.000000 +-0.000040   IN  C  RS446  COMPOSITE R
0028    50 0.000110 +-0.000040   SN  C  RS446  COMPOSITE R
0028    51 0.000030 +-0.000080   SB  C  RS446  COMPOSITE R
0028    56 0.000000 +-0.000210   BA  C  RS446  COMPOSITE R
0028    80 0.000070 +-0.000010   HG  C  RS446  COMPOSITE R
0028    82 0.012430 +-0.001243   PB  C  RS446  COMPOSITE R
0029    13 0.063160 +-0.006316   AL  C  RS449  COMPOSITE S
0029    14 0.211420 +-0.021142   SI  C  RS449  COMPOSITE S
0029    15 0.001990 +-0.000199   P   C  RS449  COMPOSITE S
0029    16 0.009940 +-0.000994   S   C  RS449  COMPOSITE S
0029    17 0.000710 +-0.000120   CL  C  RS449  COMPOSITE S
0029    19 0.012110 +-0.001211   K   C  RS449  COMPOSITE S
0029    20 0.032160 +-0.003216   CA  C  RS449  COMPOSITE S
0029    22 0.003150 +-0.000315   TI  C  RS449  COMPOSITE S
0029    23 0.000270 +-0.000027   V   C  RS449  COMPOSITE S
0029    24 0.000300 +-0.000030   CR  C  RS449  COMPOSITE S
0029    25 0.001170 +-0.000117   MN  C  RS449  COMPOSITE S
0029    26 0.052160 +-0.005216   FE  C  RS449  COMPOSITE S
0029    28 0.000360 +-0.000036   NI  C  RS449  COMPOSITE S
0029    29 0.052000 +-0.005200   CU  C  RS449  COMPOSITE S
0029    30 0.030870 +-0.003087   ZN  C  RS449  COMPOSITE S
0029    33 0.001580 +-0.000158   AS  C  RS449  COMPOSITE S
0029    34 0.000050 +-0.000010   SE  C  RS449  COMPOSITE S
0029    35 0.000160 +-0.000020   BR  C  RS449  COMPOSITE S
0029    38 0.000300 +-0.000030   SR  C  RS449  COMPOSITE S
0029    46 0.000020 +-0.000040   PD  C  RS449  COMPOSITE S
0029    47 0.000170 +-0.000060   AG  C  RS449  COMPOSITE S
0029    48 0.000490 +-0.000110   CD  C  RS449  COMPOSITE S
0029    49 0.000000 +-0.000090   IN  C  RS449  COMPOSITE S
0029    50 0.000760 +-0.000120   SN  C  RS449  COMPOSITE S
0029    51 0.000620 +-0.000220   SB  C  RS449  COMPOSITE S
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0029     56 0.000000 +-0.000520   BA   C   RS449   COMPOSITE S
0029     80 0.000110 +-0.000020   HG   C   RS449   COMPOSITE S
0029     82 0.018250 +-0.001825   PB   C   RS449   COMPOSITE S
0030     13 0.140580 +-0.014058   AL   C   RS369   I-1
0030     14 0.323290 +-0.032329   SI   C   RS369   I-1
0030     15 0.000900 +-0.000090   P    C   RS369   I-1
0030     16 0.001140 +-0.000114   S    C   RS369   I-1
0030     17 0.000470 +-0.000050   CL   C   RS369   I-1
0030     19 0.002240 +-0.000224   K    C   RS369   I-1
0030     20 0.012370 +-0.001237   CA   C   RS369   I-1
0030     22 0.000850 +-0.000085   TI   C   RS369   I-1
0030     23 0.000100 +-0.000010   V    C   RS369   I-1
0030     24 0.000190 +-0.000019   CR   C   RS369   I-1
0030     25 0.000690 +-0.000069   MN   C   RS369   I-1
0030     26 0.025780 +-0.002578   FE   C   RS369   I-1
0030     28 0.000080 +-0.000010   NI   C   RS369   I-1
0030     29 0.000140 +-0.000014   CU   C   RS369   I-1
0030     30 0.000240 +-0.000024   ZN   C   RS369   I-1
0030     33 0.000050 +-0.000020   AS   C   RS369   I-1
0030     34 0.000010 +-0.000001   SE   C   RS369   I-1
0030     35 0.000020 +-0.000010   BR   C   RS369   I-1
0030     38 0.000100 +-0.000010   SR   C   RS369   I-1
0030     46 0.000000 +-0.000030   PD   C   RS369   I-1
0030     47 0.000000 +-0.000040   AG   C   RS369   I-1
0030     48 0.000040 +-0.000050   CD   C   RS369   I-1
0030     49 0.000000 +-0.000050   IN   C   RS369   I-1
0030     50 0.000120 +-0.000060   SN   C   RS369   I-1
0030     51 0.000160 +-0.000120   SB   C   RS369   I-1
0030     56 0.000040 +-0.000310   BA   C   RS369   I-1
0030     80 0.000020 +-0.000010   HG   C   RS369   I-1
0030     82 0.000260 +-0.000030   PB   C   RS369   I-1
0031     13 0.007010 +-0.000701   AL   C   RS359   I-2
0031     14 0.019960 +-0.001996   SI   C   RS359   I-2
0031     15 0.001560 +-0.000156   P    C   RS359   I-2
0031     16 0.028520 +-0.003750   S    C   RS359   I-2
0031     17 0.000000 +-0.000270   CL   C   RS359   I-2
0031     19 0.001660 +-0.000166   K    C   RS359   I-2
0031     20 0.018920 +-0.001892   CA   C   RS359   I-2
0031     22 0.000590 +-0.000059   TI   C   RS359   I-2
0031     23 0.000080 +-0.000010   V    C   RS359   I-2
0031     24 0.000140 +-0.000014   CR   C   RS359   I-2
0031     25 0.000750 +-0.000075   MN   C   RS359   I-2
0031     26 0.014000 +-0.001400   FE   C   RS359   I-2
0031     28 0.000580 +-0.000058   NI   C   RS359   I-2
0031     29 0.033150 +-0.003315   CU   C   RS359   I-2
0031     30 0.010810 +-0.001081   ZN   C   RS359   I-2
0031     33 0.011230 +-0.001123   AS   C   RS359   I-2
0031     34 0.000250 +-0.000030   SE   C   RS359   I-2
0031     35 0.001060 +-0.000106   BR   C   RS359   I-2
0031     38 0.000260 +-0.000030   SR   C   RS359   I-2
0031     46 0.000110 +-0.000050   PD   C   RS359   I-2
0031     47 0.000790 +-0.000090   AG   C   RS359   I-2
0031     48 0.001280 +-0.000130   CD   C   RS359   I-2
0031     49 0.000330 +-0.000100   IN   C   RS359   I-2
0031     50 0.003590 +-0.000359   SN   C   RS359   I-2
0031     51 0.006720 +-0.000672   SB   C   RS359   I-2
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0031      56 0.000000 +-0.000500    BA   C   RS359   I-2
0031      80 0.000060 +-0.000050    HG   C   RS359   I-2
0031      82 0.084700 +-0.008470    PB   C   RS359   I-2
0032      13 0.007650 +-0.000765    AL   C   RS361   I-3
0032      14 0.015460 +-0.001546    SI   C   RS361   I-3
0032      15 0.002870 +-0.000287    P    C   RS361   I-3
0032      16 0.064110 +-0.008460    S    C   RS361   I-3
0032      17 0.000000 +-0.000560    CL   C   RS361   I-3
0032      19 0.002710 +-0.000271    K    C   RS361   I-3
0032      20 0.189330 +-0.018933    CA   C   RS361   I-3
0032      22 0.000730 +-0.000073    TI   C   RS361   I-3
0032      23 0.000150 +-0.000015    V    C   RS361   I-3
0032      24 0.000200 +-0.000020    CR   C   RS361   I-3
0032      25 0.002130 +-0.000213    MN   C   RS361   I-3
0032      26 0.027690 +-0.002769    FE   C   RS361   I-3
0032      28 0.000490 +-0.000049    NI   C   RS361   I-3
0032      29 0.018020 +-0.001802    CU   C   RS361   I-3
0032      30 0.020930 +-0.002093    ZN   C   RS361   I-3
0032      33 0.002700 +-0.000570    AS   C   RS361   I-3
0032      34 0.000120 +-0.000050    SE   C   RS361   I-3
0032      35 0.000580 +-0.000058    BR   C   RS361   I-3
0032      38 0.001150 +-0.000115    SR   C   RS361   I-3
0032      46 0.000530 +-0.000060    PD   C   RS361   I-3
0032      47 0.000960 +-0.000096    AG   C   RS361   I-3
0032      48 0.002880 +-0.000288    CD   C   RS361   I-3
0032      49 0.000150 +-0.000080    IN   C   RS361   I-3
0032      50 0.001150 +-0.000120    SN   C   RS361   I-3
0032      51 0.002920 +-0.000292    SB   C   RS361   I-3
0032      56 0.000780 +-0.000420    BA   C   RS361   I-3
0032      80 0.000000 +-0.000080    HG   C   RS361   I-3
0032      82 0.195510 +-0.019551    PB   C   RS361   I-3
0033      13 0.001150 +-0.000350    AL   C   RS363   I-4
0033      14 0.002540 +-0.000320    SI   C   RS363   I-4
0033      15 0.000050 +-0.000120    P    C   RS363   I-4
0033      16 0.003100 +-0.000600    S    C   RS363   I-4
0033      17 0.000100 +-0.000180    CL   C   RS363   I-4
0033      19 0.000000 +-0.000250    K    C   RS363   I-4
0033      20 0.002370 +-0.000237    CA   C   RS363   I-4
0033      22 0.000130 +-0.000040    TI   C   RS363   I-4
0033      23 0.000010 +-0.000020    V    C   RS363   I-4
0033      24 0.000000 +-0.000030    CR   C   RS363   I-4
0033      25 0.000060 +-0.000030    MN   C   RS363   I-4
0033      26 0.001790 +-0.000190    FE   C   RS363   I-4
0033      28 0.000000 +-0.000040    NI   C   RS363   I-4
0033      29 0.000860 +-0.000090    CU   C   RS363   I-4
0033      30 0.001420 +-0.000142    ZN   C   RS363   I-4
0033      33 0.000200 +-0.000150    AS   C   RS363   I-4
0033      34 0.000020 +-0.000030    SE   C   RS363   I-4
0033      35 0.000060 +-0.000040    BR   C   RS363   I-4
0033      38 0.000120 +-0.000050    SR   C   RS363   I-4
0033      46 0.000000 +-0.000170    PD   C   RS363   I-4
0033      47 0.000000 +-0.000240    AG   C   RS363   I-4
0033      48 0.000270 +-0.000380    CD   C   RS363   I-4
0033      49 0.000000 +-0.000390    IN   C   RS363   I-4
0033      50 0.000150 +-0.000440    SN   C   RS363   I-4
0033      51 0.000330 +-0.000830    SB   C   RS363   I-4
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0033     56 0.000090 +-0.002200   BA   C   RS363   I-4
0033     80 0.000100 +-0.000060   HG   C   RS363   I-4
0033     82 0.004810 +-0.000481   PB   C   RS363   I-4
0034     13 0.011990 +-0.001199   AL   C   RS365   I-5
0034     14 0.033940 +-0.003394   SI   C   RS365   I-5
0034     15 0.000000 +-0.000290   P    C   RS365   I-5
0034     16 0.006630 +-0.000663   S    C   RS365   I-5
0034     17 0.004100 +-0.000410   CL   C   RS365   I-5
0034     19 0.001350 +-0.000230   K    C   RS365   I-5
0034     20 0.297230 +-0.029723   CA   C   RS365   I-5
0034     22 0.000530 +-0.000053   TI   C   RS365   I-5
0034     23 0.000030 +-0.000010   V    C   RS365   I-5
0034     24 0.000030 +-0.000010   CR   C   RS365   I-5
0034     25 0.000280 +-0.000028   MN   C   RS365   I-5
0034     26 0.005360 +-0.000536   FE   C   RS365   I-5
0034     28 0.000010 +-0.000010   NI   C   RS365   I-5
0034     29 0.000090 +-0.000010   CU   C   RS365   I-5
0034     30 0.000200 +-0.000020   ZN   C   RS365   I-5
0034     33 0.000030 +-0.000020   AS   C   RS365   I-5
0034     34 0.000000 +-0.000010   SE   C   RS365   I-5
0034     35 0.000030 +-0.000010   BR   C   RS365   I-5
0034     38 0.000180 +-0.000020   SR   C   RS365   I-5
0034     46 0.000000 +-0.000040   PD   C   RS365   I-5
0034     47 0.000000 +-0.000050   AG   C   RS365   I-5
0034     48 0.000040 +-0.000080   CD   C   RS365   I-5
0034     49 0.000000 +-0.000080   IN   C   RS365   I-5
0034     50 0.000000 +-0.000090   SN   C   RS365   I-5
0034     51 0.000000 +-0.000170   SB   C   RS365   I-5
0034     56 0.000000 +-0.000440   BA   C   RS365   I-5
0034     80 0.000000 +-0.000010   HG   C   RS365   I-5
0034     82 0.000480 +-0.000048   PB   C   RS365   I-5
0035     13 0.006900 +-0.000690   AL   C   RS368   I-7
0035     14 0.011630 +-0.001163   SI   C   RS368   I-7
0035     15 0.005290 +-0.000529   P    C   RS368   I-7
0035     16 0.104550 +-0.013340   S    C   RS368   I-7
0035     17 0.008750 +-0.001040   CL   C   RS368   I-7
0035     19 0.008330 +-0.000833   K    C   RS368   I-7
0035     20 0.004220 +-0.000422   CA   C   RS368   I-7
0035     22 0.000220 +-0.000022   TI   C   RS368   I-7
0035     23 0.000090 +-0.000010   V    C   RS368   I-7
0035     24 0.000240 +-0.000024   CR   C   RS368   I-7
0035     25 0.000250 +-0.000025   MN   C   RS368   I-7
0035     26 0.003900 +-0.000390   FE   C   RS368   I-7
0035     28 0.000660 +-0.000066   NI   C   RS368   I-7
0035     29 0.006950 +-0.000695   CU   C   RS368   I-7
0035     30 0.137820 +-0.013782   ZN   C   RS368   I-7
0035     33 0.035340 +-0.003534   AS   C   RS368   I-7
0035     34 0.000690 +-0.000080   SE   C   RS368   I-7
0035     35 0.003930 +-0.000393   BR   C   RS368   I-7
0035     38 0.000070 +-0.000070   SR   C   RS368   I-7
0035     46 0.001420 +-0.000142   PD   C   RS368   I-7
0035     47 0.001040 +-0.000120   AG   C   RS368   I-7
0035     48 0.110660 +-0.011066   CD   C   RS368   I-7
0035     49 0.001290 +-0.000160   IN   C   RS368   I-7
0035     50 0.004690 +-0.000469   SN   C   RS368   I-7
0035     51 0.003480 +-0.000520   SB   C   RS368   I-7
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0035     56 0.002160 +-0.000690   BA   C   RS368   I-7
0035     80 0.000330 +-0.000130   HG   C   RS368   I-7
0035     82 0.307510 +-0.030751   PB   C   RS368   I-7
0036     13 0.013340 +-0.001334   AL   C   RS373   I-8
0036     14 0.038500 +-0.003850   SI   C   RS373   I-8
0036     15 0.005610 +-0.000561   P    C   RS373   I-8
0036     16 0.123480 +-0.012640   S    C   RS373   I-8
0036     17 0.000000 +-0.000840   CL   C   RS373   I-8
0036     19 0.006130 +-0.000613   K    C   RS373   I-8
0036     20 0.057670 +-0.005767   CA   C   RS373   I-8
0036     22 0.000910 +-0.000170   TI   C   RS373   I-8
0036     23 0.000110 +-0.000060   V    C   RS373   I-8
0036     24 0.000480 +-0.000048   CR   C   RS373   I-8
0036     25 0.003600 +-0.000360   MN   C   RS373   I-8
0036     26 0.058630 +-0.005863   FE   C   RS373   I-8
0036     28 0.000690 +-0.000069   NI   C   RS373   I-8
0036     29 0.019470 +-0.001947   CU   C   RS373   I-8
0036     30 0.042610 +-0.004261   ZN   C   RS373   I-8
0036     33 0.024360 +-0.002436   AS   C   RS373   I-8
0036     34 0.000840 +-0.000084   SE   C   RS373   I-8
0036     35 0.003360 +-0.000336   BR   C   RS373   I-8
0036     38 0.001850 +-0.000185   SR   C   RS373   I-8
0036     46 0.001080 +-0.000108   PD   C   RS373   I-8
0036     47 0.002840 +-0.000284   AG   C   RS373   I-8
0036     48 0.008500 +-0.000850   CD   C   RS373   I-8
0036     49 0.000370 +-0.000110   IN   C   RS373   I-8
0036     50 0.003090 +-0.000309   SN   C   RS373   I-8
0036     51 0.019800 +-0.001980   SB   C   RS373   I-8
0036     56 0.002650 +-0.000590   BA   C   RS373   I-8
0036     80 0.001260 +-0.000140   HG   C   RS373   I-8
0036     82 0.274520 +-0.027452   PB   C   RS373   I-8
0037     13 0.000550 +-0.000140   AL   C   RS375   I-9
0037     14 0.002010 +-0.000201   SI   C   RS375   I-9
0037     15 0.000130 +-0.000040   P    C   RS375   I-9
0037     16 0.002980 +-0.000470   S    C   RS375   I-9
0037     17 0.000220 +-0.000100   CL   C   RS375   I-9
0037     19 0.000380 +-0.000050   K    C   RS375   I-9
0037     20 0.001610 +-0.000161   CA   C   RS375   I-9
0037     22 0.000020 +-0.000010   TI   C   RS375   I-9
0037     23 0.000010 +-0.000010   V    C   RS375   I-9
0037     24 0.000030 +-0.000010   CR   C   RS375   I-9
0037     25 0.000080 +-0.000010   MN   C   RS375   I-9
0037     26 0.001800 +-0.000180   FE   C   RS375   I-9
0037     28 0.000020 +-0.000010   NI   C   RS375   I-9
0037     29 0.000800 +-0.000080   CU   C   RS375   I-9
0037     30 0.002330 +-0.000233   ZN   C   RS375   I-9
0037     33 0.000900 +-0.000110   AS   C   RS375   I-9
0037     34 0.000030 +-0.000010   SE   C   RS375   I-9
0037     35 0.000110 +-0.000020   BR   C   RS375   I-9
0037     38 0.000010 +-0.000020   SR   C   RS375   I-9
0037     46 0.000000 +-0.000060   PD   C   RS375   I-9
0037     47 0.000000 +-0.000090   AG   C   RS375   I-9
0037     48 0.000700 +-0.000140   CD   C   RS375   I-9
0037     49 0.000000 +-0.000130   IN   C   RS375   I-9
0037     50 0.000110 +-0.000140   SN   C   RS375   I-9
0037     51 0.000460 +-0.000280   SB   C   RS375   I-9
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0037     56 0.000380 +-0.000720   BA  C  RS375  I-9
0037     80 0.000030 +-0.000020   HG  C  RS375  I-9
0037     82 0.008410 +-0.000841   PB  C  RS375  I-9
0038     13 0.002070 +-0.000207   AL  C  RS379  I-10
0038     14 0.002990 +-0.000299   SI  C  RS379  I-10
0038     15 0.001300 +-0.000130   P   C  RS379  I-10
0038     16 0.019300 +-0.003150   S   C  RS379  I-10
0038     17 0.003100 +-0.000310   CL  C  RS379  I-10
0038     19 0.004600 +-0.000460   K   C  RS379  I-10
0038     20 0.002050 +-0.000205   CA  C  RS379  I-10
0038     22 0.000300 +-0.000030   TI  C  RS379  I-10
0038     23 0.000100 +-0.000010   V   C  RS379  I-10
0038     24 0.000150 +-0.000015   CR  C  RS379  I-10
0038     25 0.000200 +-0.000020   MN  C  RS379  I-10
0038     26 0.002880 +-0.000288   FE  C  RS379  I-10
0038     28 0.001220 +-0.000122   NI  C  RS379  I-10
0038     29 0.004660 +-0.000466   CU  C  RS379  I-10
0038     30 0.663190 +-0.066319   ZN  C  RS379  I-10
0038     33 0.007320 +-0.000732   AS  C  RS379  I-10
0038     34 0.000290 +-0.000030   SE  C  RS379  I-10
0038     35 0.000800 +-0.000080   BR  C  RS379  I-10
0038     38 0.000060 +-0.000020   SR  C  RS379  I-10
0038     46 0.001140 +-0.000114   PD  C  RS379  I-10
0038     47 0.000310 +-0.000060   AG  C  RS379  I-10
0038     48 0.000690 +-0.000090   CD  C  RS379  I-10
0038     49 0.000500 +-0.000090   IN  C  RS379  I-10
0038     50 0.004550 +-0.000455   SN  C  RS379  I-10
0038     51 0.003330 +-0.000333   SB  C  RS379  I-10
0038     56 0.000970 +-0.000410   BA  C  RS379  I-10
0038     80 0.000690 +-0.000069   HG  C  RS379  I-10
0038     82 0.077110 +-0.007711   PB  C  RS379  I-10
0039     13 0.003520 +-0.000352   AL  C  RS377  I-11
0039     14 0.011470 +-0.001147   SI  C  RS377  I-11
0039     15 0.001010 +-0.000101   P   C  RS377  I-11
0039     16 0.003260 +-0.000350   S   C  RS377  I-11
0039     17 0.000600 +-0.000110   CL  C  RS377  I-11
0039     19 0.001160 +-0.000116   K   C  RS377  I-11
0039     20 0.006700 +-0.000670   CA  C  RS377  I-11
0039     22 0.000790 +-0.000079   TI  C  RS377  I-11
0039     23 0.000140 +-0.000020   V   C  RS377  I-11
0039     24 0.000260 +-0.000030   CR  C  RS377  I-11
0039     25 0.000240 +-0.000024   MN  C  RS377  I-11
0039     26 0.008810 +-0.000881   FE  C  RS377  I-11
0039     28 0.002390 +-0.000239   NI  C  RS377  I-11
0039     29 0.619250 +-0.061925   CU  C  RS377  I-11
0039     30 0.005600 +-0.000560   ZN  C  RS377  I-11
0039     33 0.000060 +-0.000070   AS  C  RS377  I-11
0039     34 0.000040 +-0.000010   SE  C  RS377  I-11
0039     35 0.000070 +-0.000020   BR  C  RS377  I-11
0039     38 0.000050 +-0.000030   SR  C  RS377  I-11
0039     46 0.000000 +-0.000080   PD  C  RS377  I-11
0039     47 0.000000 +-0.000120   AG  C  RS377  I-11
0039     48 0.000060 +-0.000160   CD  C  RS377  I-11
0039     49 0.000210 +-0.000180   IN  C  RS377  I-11
0039     50 0.000820 +-0.000210   SN  C  RS377  I-11
0039     51 0.000680 +-0.000360   SB  C  RS377  I-11
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0039      56 0.000760 +-0.000950   BA   C   RS377   I-11
0039      80 0.000080 +-0.000030   HG   C   RS377   I-11
0039      82 0.002910 +-0.000291   PB   C   RS377   I-11
0040      13 0.002030 +-0.000220   AL   C   RS381   I-12
0040      14 0.003210 +-0.000321   SI   C   RS381   I-12
0040      15 0.001230 +-0.000123   P    C   RS381   I-12
0040      16 0.021980 +-0.003250   S    C   RS381   I-12
0040      17 0.000000 +-0.000280   CL   C   RS381   I-12
0040      19 0.004600 +-0.000460   K    C   RS381   I-12
0040      20 0.001830 +-0.000183   CA   C   RS381   I-12
0040      22 0.000270 +-0.000030   TI   C   RS381   I-12
0040      23 0.000130 +-0.000013   V    C   RS381   I-12
0040      24 0.000150 +-0.000020   CR   C   RS381   I-12
0040      25 0.000210 +-0.000021   MN   C   RS381   I-12
0040      26 0.001640 +-0.000164   FE   C   RS381   I-12
0040      28 0.001170 +-0.000117   NI   C   RS381   I-12
0040      29 0.002870 +-0.000287   CU   C   RS381   I-12
0040      30 0.684290 +-0.068429   ZN   C   RS381   I-12
0040      33 0.007040 +-0.000704   AS   C   RS381   I-12
0040      34 0.000210 +-0.000030   SE   C   RS381   I-12
0040      35 0.000790 +-0.000079   BR   C   RS381   I-12
0040      38 0.000080 +-0.000030   SR   C   RS381   I-12
0040      46 0.000840 +-0.000090   PD   C   RS381   I-12
0040      47 0.000300 +-0.000080   AG   C   RS381   I-12
0040      48 0.000700 +-0.000120   CD   C   RS381   I-12
0040      49 0.000510 +-0.000130   IN   C   RS381   I-12
0040      50 0.003630 +-0.000363   SN   C   RS381   I-12
0040      51 0.003670 +-0.000380   SB   C   RS381   I-12
0040      56 0.000800 +-0.000660   BA   C   RS381   I-12
0040      80 0.000740 +-0.000080   HG   C   RS381   I-12
0040      82 0.075440 +-0.007544   PB   C   RS381   I-12
0041      13 0.025680 +-0.002568   AL   C   RS383   I-14
0041      14 0.062500 +-0.006250   SI   C   RS383   I-14
0041      15 0.001180 +-0.000118   P    C   RS383   I-14
0041      16 0.005680 +-0.000568   S    C   RS383   I-14
0041      17 0.000320 +-0.000070   CL   C   RS383   I-14
0041      19 0.001670 +-0.000167   K    C   RS383   I-14
0041      20 0.022850 +-0.002285   CA   C   RS383   I-14
0041      22 0.001570 +-0.000157   TI   C   RS383   I-14
0041      23 0.000090 +-0.000020   V    C   RS383   I-14
0041      24 0.000050 +-0.000010   CR   C   RS383   I-14
0041      25 0.000110 +-0.000011   MN   C   RS383   I-14
0041      26 0.009070 +-0.000907   FE   C   RS383   I-14
0041      28 0.000060 +-0.000010   NI   C   RS383   I-14
0041      29 0.007310 +-0.000731   CU   C   RS383   I-14
0041      30 0.003130 +-0.000313   ZN   C   RS383   I-14
0041      33 0.000210 +-0.000040   AS   C   RS383   I-14
0041      34 0.000010 +-0.000010   SE   C   RS383   I-14
0041      35 0.000020 +-0.000010   BR   C   RS383   I-14
0041      38 0.000060 +-0.000020   SR   C   RS383   I-14
0041      46 0.000000 +-0.000050   PD   C   RS383   I-14
0041      47 0.000040 +-0.000070   AG   C   RS383   I-14
0041      48 0.000130 +-0.000100   CD   C   RS383   I-14
0041      49 0.000060 +-0.000110   IN   C   RS383   I-14
0041      50 0.000000 +-0.000120   SN   C   RS383   I-14
0041      51 0.000690 +-0.000230   SB   C   RS383   I-14
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0041      56 0.000000 +-0.000610   BA   C   RS383   I-14
0041      80 0.000010 +-0.000020   HG   C   RS383   I-14
0041      82 0.001310 +-0.000131   PB   C   RS383   I-14
0042      13 0.006110 +-0.000611   AL   C   RS387   I-15
0042      14 0.012300 +-0.001230   SI   C   RS387   I-15
0042      15 0.002650 +-0.000265   P    C   RS387   I-15
0042      16 0.042620 +-0.004262   S    C   RS387   I-15
0042      17 0.000000 +-0.000140   CL   C   RS387   I-15
0042      19 0.000560 +-0.000056   K    C   RS387   I-15
0042      20 0.004010 +-0.000401   CA   C   RS387   I-15
0042      22 0.000180 +-0.000020   TI   C   RS387   I-15
0042      23 0.000370 +-0.000037   V    C   RS387   I-15
0042      24 0.000090 +-0.000010   CR   C   RS387   I-15
0042      25 0.000120 +-0.000012   MN   C   RS387   I-15
0042      26 0.004590 +-0.000459   FE   C   RS387   I-15
0042      28 0.000210 +-0.000021   NI   C   RS387   I-15
0042      29 0.001200 +-0.000120   CU   C   RS387   I-15
0042      30 0.002190 +-0.000219   ZN   C   RS387   I-15
0042      33 0.000460 +-0.000060   AS   C   RS387   I-15
0042      34 0.000020 +-0.000010   SE   C   RS387   I-15
0042      35 0.000060 +-0.000010   BR   C   RS387   I-15
0042      38 0.000090 +-0.000010   SR   C   RS387   I-15
0042      46 0.000000 +-0.000040   PD   C   RS387   I-15
0042      47 0.000080 +-0.000050   AG   C   RS387   I-15
0042      48 0.000410 +-0.000090   CD   C   RS387   I-15
0042      49 0.000000 +-0.000080   IN   C   RS387   I-15
0042      50 0.000000 +-0.000100   SN   C   RS387   I-15
0042      51 0.000410 +-0.000170   SB   C   RS387   I-15
0042      56 0.000000 +-0.000460   BA   C   RS387   I-15
0042      80 0.000000 +-0.000010   HG   C   RS387   I-15
0042      82 0.005060 +-0.000506   PB   C   RS387   I-15
0043      13 0.027780 +-0.002778   AL   C   RS389   I-16
0043      14 0.068910 +-0.006891   SI   C   RS389   I-16
0043      15 0.001390 +-0.000139   P    C   RS389   I-16
0043      16 0.005590 +-0.000559   S    C   RS389   I-16
0043      17 0.000420 +-0.000080   CL   C   RS389   I-16
0043      19 0.001960 +-0.000196   K    C   RS389   I-16
0043      20 0.022550 +-0.002255   CA   C   RS389   I-16
0043      22 0.001580 +-0.000158   TI   C   RS389   I-16
0043      23 0.000050 +-0.000020   V    C   RS389   I-16
0043      24 0.000090 +-0.000010   CR   C   RS389   I-16
0043      25 0.000130 +-0.000020   MN   C   RS389   I-16
0043      26 0.008770 +-0.000877   FE   C   RS389   I-16
0043      28 0.000020 +-0.000010   NI   C   RS389   I-16
0043      29 0.001010 +-0.000101   CU   C   RS389   I-16
0043      30 0.000420 +-0.000042   ZN   C   RS389   I-16
0043      33 0.000100 +-0.000050   AS   C   RS389   I-16
0043      34 0.000000 +-0.000010   SE   C   RS389   I-16
0043      35 0.000000 +-0.000010   BR   C   RS389   I-16
0043      38 0.000080 +-0.000020   SR   C   RS389   I-16
0043      46 0.000000 +-0.000050   PD   C   RS389   I-16
0043      47 0.000030 +-0.000080   AG   C   RS389   I-16
0043      48 0.000030 +-0.000110   CD   C   RS389   I-16
0043      49 0.000000 +-0.000120   IN   C   RS389   I-16
0043      50 0.000000 +-0.000140   SN   C   RS389   I-16
0043      51 0.000530 +-0.000250   SB   C   RS389   I-16
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0043      56 0.000000 +-0.000710    BA   C   RS389    I-16
0043      80 0.000000 +-0.000020    HG   C   RS389    I-16
0043      82 0.001670 +-0.000167    PB   C   RS389    I-16
0044      13 0.046270 +-0.004627    AL   C   RS391    I-17
0044      14 0.113460 +-0.011346    SI   C   RS391    I-17
0044      15 0.000850 +-0.000085    P    C   RS391    I-17
0044      16 0.004170 +-0.000417    S    C   RS391    I-17
0044      17 0.000670 +-0.000080    CL   C   RS391    I-17
0044      19 0.004890 +-0.000489    K    C   RS391    I-17
0044      20 0.034220 +-0.003422    CA   C   RS391    I-17
0044      22 0.001610 +-0.000161    TI   C   RS391    I-17
0044      23 0.000080 +-0.000020    V    C   RS391    I-17
0044      24 0.000070 +-0.000010    CR   C   RS391    I-17
0044      25 0.000090 +-0.000010    MN   C   RS391    I-17
0044      26 0.009450 +-0.000945    FE   C   RS391    I-17
0044      28 0.000020 +-0.000010    NI   C   RS391    I-17
0044      29 0.000070 +-0.000020    CU   C   RS391    I-17
0044      30 0.000070 +-0.000020    ZN   C   RS391    I-17
0044      33 0.000020 +-0.000030    AS   C   RS391    I-17
0044      34 0.000000 +-0.000010    SE   C   RS391    I-17
0044      35 0.000010 +-0.000010    BR   C   RS391    I-17
0044      38 0.000150 +-0.000020    SR   C   RS391    I-17
0044      46 0.000000 +-0.000050    PD   C   RS391    I-17
0044      47 0.000020 +-0.000070    AG   C   RS391    I-17
0044      48 0.000170 +-0.000100    CD   C   RS391    I-17
0044      49 0.000050 +-0.000110    IN   C   RS391    I-17
0044      50 0.000000 +-0.000130    SN   C   RS391    I-17
0044      51 0.000180 +-0.000210    SB   C   RS391    I-17
0044      56 0.000000 +-0.000610    BA   C   RS391    I-17
0044      80 0.000020 +-0.000020    HG   C   RS391    I-17
0044      82 0.000180 +-0.000040    PB   C   RS391    I-17
0045      13 0.060150 +-0.006015    AL   C   RS393    I-18
0045      14 0.170860 +-0.017086    SI   C   RS393    I-18
0045      15 0.001610 +-0.000161    P    C   RS393    I-18
0045      16 0.009450 +-0.000945    S    C   RS393    I-18
0045      17 0.000240 +-0.000080    CL   C   RS393    I-18
0045      19 0.008310 +-0.000831    K    C   RS393    I-18
0045      20 0.002640 +-0.000264    CA   C   RS393    I-18
0045      22 0.001970 +-0.000197    TI   C   RS393    I-18
0045      23 0.000150 +-0.000020    V    C   RS393    I-18
0045      24 0.000090 +-0.000020    CR   C   RS393    I-18
0045      25 0.000090 +-0.000010    MN   C   RS393    I-18
0045      26 0.014680 +-0.001468    FE   C   RS393    I-18
0045      28 0.000050 +-0.000020    NI   C   RS393    I-18
0045      29 0.000130 +-0.000020    CU   C   RS393    I-18
0045      30 0.000100 +-0.000020    ZN   C   RS393    I-18
0045      33 0.000010 +-0.000030    AS   C   RS393    I-18
0045      34 0.000000 +-0.000010    SE   C   RS393    I-18
0045      35 0.000000 +-0.000010    BR   C   RS393    I-18
0045      38 0.000320 +-0.000032    SR   C   RS393    I-18
0045      46 0.000000 +-0.000060    PD   C   RS393    I-18
0045      47 0.000000 +-0.000080    AG   C   RS393    I-18
0045      48 0.000000 +-0.000120    CD   C   RS393    I-18
0045      49 0.000110 +-0.000130    IN   C   RS393    I-18
0045      50 0.000000 +-0.000150    SN   C   RS393    I-18
0045      51 0.000090 +-0.000290    SB   C   RS393    I-18
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0045     56 0.001120 +-0.000790   BA   C   RS393   I-18
0045     80 0.000020 +-0.000020   HG   C   RS393   I-18
0045     82 0.000330 +-0.000050   PB   C   RS393   I-18
0046     13 0.041210 +-0.004121   AL   C   RS416   I-19
0046     14 0.112790 +-0.011279   SI   C   RS416   I-19
0046     15 0.001780 +-0.000178   P    C   RS416   I-19
0046     16 0.022450 +-0.002245   S    C   RS416   I-19
0046     17 0.000000 +-0.000240   CL   C   RS416   I-19
0046     19 0.005190 +-0.000519   K    C   RS416   I-19
0046     20 0.010470 +-0.001047   CA   C   RS416   I-19
0046     22 0.001780 +-0.000178   TI   C   RS416   I-19
0046     23 0.000130 +-0.000030   V    C   RS416   I-19
0046     24 0.000090 +-0.000020   CR   C   RS416   I-19
0046     25 0.000740 +-0.000074   MN   C   RS416   I-19
0046     26 0.023150 +-0.002315   FE   C   RS416   I-19
0046     28 0.000130 +-0.000030   NI   C   RS416   I-19
0046     29 0.005010 +-0.000501   CU   C   RS416   I-19
0046     30 0.011450 +-0.001145   ZN   C   RS416   I-19
0046     33 0.006580 +-0.000658   AS   C   RS416   I-19
0046     34 0.000100 +-0.000030   SE   C   RS416   I-19
0046     35 0.000610 +-0.000061   BR   C   RS416   I-19
0046     38 0.000400 +-0.000050   SR   C   RS416   I-19
0046     46 0.000000 +-0.000110   PD   C   RS416   I-19
0046     47 0.000350 +-0.000160   AG   C   RS416   I-19
0046     48 0.000260 +-0.000240   CD   C   RS416   I-19
0046     49 0.000280 +-0.000240   IN   C   RS416   I-19
0046     50 0.000920 +-0.000270   SN   C   RS416   I-19
0046     51 0.002610 +-0.000590   SB   C   RS416   I-19
0046     56 0.001730 +-0.001330   BA   C   RS416   I-19
0046     80 0.000100 +-0.000060   HG   C   RS416   I-19
0046     82 0.039430 +-0.003943   PB   C   RS416   I-19
0047     13 0.078480 +-0.007848   AL   C   RS413   I-20
0047     14 0.209090 +-0.020909   SI   C   RS413   I-20
0047     15 0.002600 +-0.000260   P    C   RS413   I-20
0047     16 0.007060 +-0.000706   S    C   RS413   I-20
0047     17 0.088320 +-0.008832   CL   C   RS413   I-20
0047     19 0.011940 +-0.001194   K    C   RS413   I-20
0047     20 0.023870 +-0.002387   CA   C   RS413   I-20
0047     22 0.003530 +-0.000353   TI   C   RS413   I-20
0047     23 0.000220 +-0.000022   V    C   RS413   I-20
0047     24 0.000250 +-0.000025   CR   C   RS413   I-20
0047     25 0.000870 +-0.000087   MN   C   RS413   I-20
0047     26 0.037750 +-0.003775   FE   C   RS413   I-20
0047     28 0.000100 +-0.000010   NI   C   RS413   I-20
0047     29 0.001690 +-0.000169   CU   C   RS413   I-20
0047     30 0.001230 +-0.000123   ZN   C   RS413   I-20
0047     33 0.000080 +-0.000030   AS   C   RS413   I-20
0047     34 0.000010 +-0.000001   SE   C   RS413   I-20
0047     35 0.000040 +-0.000010   BR   C   RS413   I-20
0047     38 0.000210 +-0.000021   SR   C   RS413   I-20
0047     46 0.000030 +-0.000030   PD   C   RS413   I-20
0047     47 0.000070 +-0.000040   AG   C   RS413   I-20
0047     48 0.000060 +-0.000060   CD   C   RS413   I-20
0047     49 0.000000 +-0.000060   IN   C   RS413   I-20
0047     50 0.000090 +-0.000080   SN   C   RS413   I-20
0047     51 0.000000 +-0.000140   SB   C   RS413   I-20
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0047      56 0.000000 +-0.000350   BA  C  RS413  I-20
0047      80 0.000020 +-0.000010   HG  C  RS413  I-20
0047      82 0.001070 +-0.000107   PB  C  RS413  I-20
0048      13 0.028120 +-0.002812   AL  C  RS405  II-2
0048      14 0.068260 +-0.006826   SI  C  RS405  II-2
0048      15 0.002850 +-0.000285   P   C  RS405  II-2
0048      16 0.042340 +-0.004980   S   C  RS405  II-2
0048      17 0.000000 +-0.000350   CL  C  RS405  II-2
0048      19 0.008790 +-0.000879   K   C  RS405  II-2
0048      20 0.009550 +-0.000955   CA  C  RS405  II-2
0048      22 0.003100 +-0.000310   TI  C  RS405  II-2
0048      23 0.000650 +-0.000065   V   C  RS405  II-2
0048      24 0.001020 +-0.000102   CR  C  RS405  II-2
0048      25 0.003810 +-0.000381   MN  C  RS405  II-2
0048      26 0.266180 +-0.026618   FE  C  RS405  II-2
0048      28 0.000820 +-0.000082   NI  C  RS405  II-2
0048      29 0.014110 +-0.001411   CU  C  RS405  II-2
0048      30 0.111580 +-0.011158   ZN  C  RS405  II-2
0048      33 0.006160 +-0.000616   AS  C  RS405  II-2
0048      34 0.000260 +-0.000030   SE  C  RS405  II-2
0048      35 0.000680 +-0.000068   BR  C  RS405  II-2
0048      38 0.000840 +-0.000084   SR  C  RS405  II-2
0048      46 0.000530 +-0.000060   PD  C  RS405  II-2
0048      47 0.000930 +-0.000093   AG  C  RS405  II-2
0048      48 0.003370 +-0.000337   CD  C  RS405  II-2
0048      49 0.000350 +-0.000090   IN  C  RS405  II-2
0048      50 0.001780 +-0.000178   SN  C  RS405  II-2
0048      51 0.003050 +-0.000305   SB  C  RS405  II-2
0048      56 0.000710 +-0.000450   BA  C  RS405  II-2
0048      80 0.000150 +-0.000060   HG  C  RS405  II-2
0048      82 0.111840 +-0.011184   PB  C  RS405  II-2
0049      13 0.006980 +-0.000698   AL  C  RS407  II-3
0049      14 0.019710 +-0.001971   SI  C  RS407  II-3
0049      15 0.000610 +-0.000061   P   C  RS407  II-3
0049      16 0.006560 +-0.000670   S   C  RS407  II-3
0049      17 0.000650 +-0.000120   CL  C  RS407  II-3
0049      19 0.001960 +-0.000196   K   C  RS407  II-3
0049      20 0.008110 +-0.000811   CA  C  RS407  II-3
0049      22 0.000690 +-0.000069   TI  C  RS407  II-3
0049      23 0.000220 +-0.000022   V   C  RS407  II-3
0049      24 0.000280 +-0.000028   CR  C  RS407  II-3
0049      25 0.000820 +-0.000082   MN  C  RS407  II-3
0049      26 0.039810 +-0.003981   FE  C  RS407  II-3
0049      28 0.002230 +-0.000223   NI  C  RS407  II-3
0049      29 0.558200 +-0.055820   CU  C  RS407  II-3
0049      30 0.017460 +-0.001746   ZN  C  RS407  II-3
0049      33 0.000730 +-0.000120   AS  C  RS407  II-3
0049      34 0.000040 +-0.000010   SE  C  RS407  II-3
0049      35 0.000090 +-0.000020   BR  C  RS407  II-3
0049      38 0.000230 +-0.000023   SR  C  RS407  II-3
0049      46 0.000070 +-0.000060   PD  C  RS407  II-3
0049      47 0.000130 +-0.000070   AG  C  RS407  II-3
0049      48 0.000330 +-0.000120   CD  C  RS407  II-3
0049      49 0.000220 +-0.000130   IN  C  RS407  II-3
0049      50 0.000450 +-0.000150   SN  C  RS407  II-3
0049      51 0.000030 +-0.000270   SB  C  RS407  II-3
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0049      56 0.000000 +-0.000700   BA   C   RS407   II-3
0049      80 0.000080 +-0.000030   HG   C   RS407   II-3
0049      82 0.012160 +-0.001216   PB   C   RS407   II-3
0050      13 0.019360 +-0.001936   AL   T   RL044   III-1
0050      14 0.033830 +-0.003383   SI   T   RL044   III-1
0050      15 0.001620 +-0.000162   P    T   RL044   III-1
0050      16 0.010410 +-0.001041   S    T   RL044   III-1
0050      17 0.000150 +-0.000110   CL   T   RL044   III-1
0050      19 0.001300 +-0.000130   K    T   RL044   III-1
0050      20 0.004310 +-0.000431   CA   T   RL044   III-1
0050      22 0.000780 +-0.000078   TI   T   RL044   III-1
0050      23 0.000090 +-0.000020   V    T   RL044   III-1
0050      24 0.000130 +-0.000020   CR   T   RL044   III-1
0050      25 0.000280 +-0.000028   MN   T   RL044   III-1
0050      26 0.025630 +-0.002563   FE   T   RL044   III-1
0050      28 0.000080 +-0.000020   NI   T   RL044   III-1
0050      29 0.007080 +-0.000708   CU   T   RL044   III-1
0050      30 0.004370 +-0.000437   ZN   T   RL044   III-1
0050      33 0.003890 +-0.000389   AS   T   RL044   III-1
0050      34 0.000030 +-0.000010   SE   T   RL044   III-1
0050      35 0.000320 +-0.000032   BR   T   RL044   III-1
0050      38 0.000120 +-0.000020   SR   T   RL044   III-1
0050      46 0.000000 +-0.000060   PD   T   RL044   III-1
0050      47 0.000000 +-0.000090   AG   T   RL044   III-1
0050      48 0.000350 +-0.000130   CD   T   RL044   III-1
0050      49 0.000130 +-0.000140   IN   T   RL044   III-1
0050      50 0.000400 +-0.000160   SN   T   RL044   III-1
0050      51 0.002870 +-0.000420   SB   T   RL044   III-1
0050      56 0.000000 +-0.000760   BA   T   RL044   III-1
0050      80 0.000030 +-0.000030   HG   T   RL044   III-1
0050      82 0.008690 +-0.000869   PB   T   RL044   III-1
0051      13 0.007350 +-0.000735   AL   T   RL040   III-3
0051      14 0.026130 +-0.002613   SI   T   RL040   III-3
0051      15 0.002330 +-0.000233   P    T   RL040   III-3
0051      16 0.037160 +-0.007340   S    T   RL040   III-3
0051      17 0.000000 +-0.000480   CL   T   RL040   III-3
0051      19 0.000740 +-0.000074   K    T   RL040   III-3
0051      20 0.012890 +-0.001289   CA   T   RL040   III-3
0051      22 0.000770 +-0.000077   TI   T   RL040   III-3
0051      23 0.000110 +-0.000011   V    T   RL040   III-3
0051      24 0.000220 +-0.000022   CR   T   RL040   III-3
0051      25 0.000360 +-0.000036   MN   T   RL040   III-3
0051      26 0.023660 +-0.002366   FE   T   RL040   III-3
0051      28 0.007550 +-0.000755   NI   T   RL040   III-3
0051      29 0.379190 +-0.037919   CU   T   RL040   III-3
0051      30 0.011090 +-0.001109   ZN   T   RL040   III-3
0051      33 0.064600 +-0.006460   AS   T   RL040   III-3
0051      34 0.000400 +-0.000050   SE   T   RL040   III-3
0051      35 0.005960 +-0.000596   BR   T   RL040   III-3
0051      38 0.000110 +-0.000040   SR   T   RL040   III-3
0051      46 0.002060 +-0.000206   PD   T   RL040   III-3
0051      47 0.005260 +-0.000526   AG   T   RL040   III-3
0051      48 0.003390 +-0.000339   CD   T   RL040   III-3
0051      49 0.000920 +-0.000092   IN   T   RL040   III-3
0051      50 0.006490 +-0.000649   SN   T   RL040   III-3
0051      51 0.036410 +-0.003641   SB   T   RL040   III-3
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0051     56 0.000380 +-0.000250   BA   T  RL040   III-3
0051     80 0.000240 +-0.000070   HG   T  RL040   III-3
0051     82 0.178800 +-0.017880   PB   T  RL040   III-3
0052     13 0.037540 +-0.003754   AL   C  RS417   IV-1
0052     14 0.140020 +-0.014002   SI   C  RS417   IV-1
0052     15 0.002400 +-0.000240   P    C  RS417   IV-1
0052     16 0.030670 +-0.003280   S    C  RS417   IV-1
0052     17 0.000000 +-0.000300   CL   C  RS417   IV-1
0052     19 0.007520 +-0.000752   K    C  RS417   IV-1
0052     20 0.041770 +-0.004177   CA   C  RS417   IV-1
0052     22 0.002820 +-0.000282   TI   C  RS417   IV-1
0052     23 0.000360 +-0.000036   V    C  RS417   IV-1
0052     24 0.000640 +-0.000064   CR   C  RS417   IV-1
0052     25 0.004080 +-0.000408   MN   C  RS417   IV-1
0052     26 0.119250 +-0.011925   FE   C  RS417   IV-1
0052     28 0.000460 +-0.000046   NI   C  RS417   IV-1
0052     29 0.030470 +-0.003047   CU   C  RS417   IV-1
0052     30 0.056310 +-0.005631   ZN   C  RS417   IV-1
0052     33 0.006590 +-0.000659   AS   C  RS417   IV-1
0052     34 0.000280 +-0.000030   SE   C  RS417   IV-1
0052     35 0.000700 +-0.000070   BR   C  RS417   IV-1
0052     38 0.000560 +-0.000056   SR   C  RS417   IV-1
0052     46 0.000010 +-0.000080   PD   C  RS417   IV-1
0052     47 0.000330 +-0.000120   AG   C  RS417   IV-1
0052     48 0.001200 +-0.000200   CD   C  RS417   IV-1
0052     49 0.000220 +-0.000170   IN   C  RS417   IV-1
0052     50 0.001730 +-0.000230   SN   C  RS417   IV-1
0052     51 0.002700 +-0.000450   SB   C  RS417   IV-1
0052     56 0.001340 +-0.000930   BA   C  RS417   IV-1
0052     80 0.000190 +-0.000060   HG   C  RS417   IV-1
0052     82 0.068730 +-0.006873   PB   C  RS417   IV-1
0053     13 0.035830 +-0.003583   AL   C  RS399   IV-2
0053     14 0.135290 +-0.013529   SI   C  RS399   IV-2
0053     15 0.001770 +-0.000177   P    C  RS399   IV-2
0053     16 0.017670 +-0.001767   S    C  RS399   IV-2
0053     17 0.001380 +-0.000240   CL   C  RS399   IV-2
0053     19 0.007650 +-0.000765   K    C  RS399   IV-2
0053     20 0.052130 +-0.005213   CA   C  RS399   IV-2
0053     22 0.002890 +-0.000289   TI   C  RS399   IV-2
0053     23 0.000520 +-0.000052   V    C  RS399   IV-2
0053     24 0.000700 +-0.000070   CR   C  RS399   IV-2
0053     25 0.004970 +-0.000497   MN   C  RS399   IV-2
0053     26 0.169050 +-0.016905   FE   C  RS399   IV-2
0053     28 0.000550 +-0.000055   NI   C  RS399   IV-2
0053     29 0.016270 +-0.001627   CU   C  RS399   IV-2
0053     30 0.117490 +-0.011749   ZN   C  RS399   IV-2
0053     33 0.007940 +-0.000794   AS   C  RS399   IV-2
0053     34 0.000130 +-0.000020   SE   C  RS399   IV-2
0053     35 0.000760 +-0.000076   BR   C  RS399   IV-2
0053     38 0.000550 +-0.000055   SR   C  RS399   IV-2
0053     46 0.000050 +-0.000090   PD   C  RS399   IV-2
0053     47 0.000310 +-0.000130   AG   C  RS399   IV-2
0053     48 0.000790 +-0.000200   CD   C  RS399   IV-2
0053     49 0.000330 +-0.000200   IN   C  RS399   IV-2
0053     50 0.000680 +-0.000250   SN   C  RS399   IV-2
0053     51 0.001730 +-0.000480   SB   C  RS399   IV-2
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0053     56 0.000000 +-0.001110   BA   C   RS399   IV-2
0053     80 0.000220 +-0.000050   HG   C   RS399   IV-2
0053     82 0.031720 +-0.003172   PB   C   RS399   IV-2
0054     13 0.024410 +-0.002441   AL   C   RS401   IV-3
0054     14 0.098120 +-0.009812   SI   C   RS401   IV-3
0054     15 0.002000 +-0.000200   P    C   RS401   IV-3
0054     16 0.028910 +-0.003610   S    C   RS401   IV-3
0054     17 0.000000 +-0.000250   CL   C   RS401   IV-3
0054     19 0.005440 +-0.000544   K    C   RS401   IV-3
0054     20 0.041500 +-0.004150   CA   C   RS401   IV-3
0054     22 0.001970 +-0.000197   TI   C   RS401   IV-3
0054     23 0.000280 +-0.000040   V    C   RS401   IV-3
0054     24 0.000930 +-0.000093   CR   C   RS401   IV-3
0054     25 0.006020 +-0.000602   MN   C   RS401   IV-3
0054     26 0.111020 +-0.011102   FE   C   RS401   IV-3
0054     28 0.000450 +-0.000045   NI   C   RS401   IV-3
0054     29 0.013060 +-0.001306   CU   C   RS401   IV-3
0054     30 0.080180 +-0.008018   ZN   C   RS401   IV-3
0054     33 0.005260 +-0.000526   AS   C   RS401   IV-3
0054     34 0.000160 +-0.000020   SE   C   RS401   IV-3
0054     35 0.000620 +-0.000062   BR   C   RS401   IV-3
0054     38 0.000340 +-0.000034   SR   C   RS401   IV-3
0054     46 0.000390 +-0.000040   PD   C   RS401   IV-3
0054     47 0.000690 +-0.000069   AG   C   RS401   IV-3
0054     48 0.001830 +-0.000183   CD   C   RS401   IV-3
0054     49 0.000390 +-0.000070   IN   C   RS401   IV-3
0054     50 0.001040 +-0.000104   SN   C   RS401   IV-3
0054     51 0.001780 +-0.000190   SB   C   RS401   IV-3
0054     56 0.001680 +-0.000360   BA   C   RS401   IV-3
0054     80 0.000400 +-0.000050   HG   C   RS401   IV-3
0054     82 0.082760 +-0.008276   PB   C   RS401   IV-3
0055     13 0.021500 +-0.002150   AL   C   RS419   IV-4
0055     14 0.113230 +-0.011323   SI   C   RS419   IV-4
0055     15 0.002020 +-0.000202   P    C   RS419   IV-4
0055     16 0.022370 +-0.002237   S    C   RS419   IV-4
0055     17 0.001190 +-0.000250   CL   C   RS419   IV-4
0055     19 0.005700 +-0.000570   K    C   RS419   IV-4
0055     20 0.074990 +-0.007499   CA   C   RS419   IV-4
0055     22 0.002900 +-0.000290   TI   C   RS419   IV-4
0055     23 0.000510 +-0.000051   V    C   RS419   IV-4
0055     24 0.000860 +-0.000086   CR   C   RS419   IV-4
0055     25 0.009880 +-0.000988   MN   C   RS419   IV-4
0055     26 0.152940 +-0.015294   FE   C   RS419   IV-4
0055     28 0.000460 +-0.000050   NI   C   RS419   IV-4
0055     29 0.010440 +-0.001044   CU   C   RS419   IV-4
0055     30 0.072960 +-0.007296   ZN   C   RS419   IV-4
0055     33 0.003570 +-0.000357   AS   C   RS419   IV-4
0055     34 0.000100 +-0.000020   SE   C   RS419   IV-4
0055     35 0.000310 +-0.000031   BR   C   RS419   IV-4
0055     38 0.001500 +-0.000150   SR   C   RS419   IV-4
0055     46 0.000010 +-0.000100   PD   C   RS419   IV-4
0055     47 0.000100 +-0.000120   AG   C   RS419   IV-4
0055     48 0.000370 +-0.000200   CD   C   RS419   IV-4
0055     49 0.000000 +-0.000180   IN   C   RS419   IV-4
0055     50 0.000940 +-0.000230   SN   C   RS419   IV-4
0055     51 0.000690 +-0.000420   SB   C   RS419   IV-4
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0055     56 0.001940 +-0.001090   BA  C   RS419   IV-4
0055     80 0.000140 +-0.000050   HG  C   RS419   IV-4
0055     82 0.031590 +-0.003159   PB  C   RS419   IV-4
0056     13 0.014060 +-0.001406   AL  C   RS463   0-A
0056     14 0.038750 +-0.003875   SI  C   RS463   0-A
0056     15 0.003500 +-0.000350   P   C   RS463   0-A
0056     16 0.083800 +-0.008380   S   C   RS463   0-A
0056     17 0.000000 +-0.000430   CL  C   RS463   0-A
0056     19 0.003550 +-0.000355   K   C   RS463   0-A
0056     20 0.009370 +-0.000937   CA  C   RS463   0-A
0056     22 0.000900 +-0.000090   TI  C   RS463   0-A
0056     23 0.000120 +-0.000012   V   C   RS463   0-A
0056     24 0.000200 +-0.000020   CR  C   RS463   0-A
0056     25 0.000670 +-0.000067   MN  C   RS463   0-A
0056     26 0.034030 +-0.003403   FE  C   RS463   0-A
0056     28 0.003190 +-0.000319   NI  C   RS463   0-A
0056     29 0.101410 +-0.010141   CU  C   RS463   0-A
0056     30 0.024050 +-0.002405   ZN  C   RS463   0-A
0056     33 0.005660 +-0.000566   AS  C   RS463   0-A
0056     34 0.000060 +-0.000030   SE  C   RS463   0-A
0056     35 0.000610 +-0.000061   BR  C   RS463   0-A
0056     38 0.000190 +-0.000030   SR  C   RS463   0-A
0056     46 0.000190 +-0.000050   PD  C   RS463   0-A
0056     47 0.000370 +-0.000070   AG  C   RS463   0-A
0056     48 0.002280 +-0.000228   CD  C   RS463   0-A
0056     49 0.000150 +-0.000090   IN  C   RS463   0-A
0056     50 0.001100 +-0.000130   SN  C   RS463   0-A
0056     51 0.003470 +-0.000347   SB  C   RS463   0-A
0056     56 0.000190 +-0.000530   BA  C   RS463   0-A
0056     80 0.000020 +-0.000060   HG  C   RS463   0-A
0056     82 0.120770 +-0.012077   PB  C   RS463   0-A
0057     13 0.000000 +-0.000420   AL  T   RL093   COMP  0-B
0057     14 0.008070 +-0.000807   SI  T   RL093   COMP  0-B
0057     15 0.002630 +-0.000263   P   T   RL093   COMP  0-B
0057     16 0.027690 +-0.007190   S   T   RL093   COMP  0-B
0057     17 0.011550 +-0.001155   CL  T   RL093   COMP  0-B
0057     19 0.013710 +-0.001371   K   T   RL093   COMP  0-B
0057     20 0.055870 +-0.005587   CA  T   RL093   COMP  0-B
0057     22 0.003120 +-0.000312   TI  T   RL093   COMP  0-B
0057     23 0.000000 +-0.000010   V   T   RL093   COMP  0-B
0057     24 0.000150 +-0.000015   CR  T   RL093   COMP  0-B
0057     25 0.000130 +-0.000013   MN  T   RL093   COMP  0-B
0057     26 0.001520 +-0.000152   FE  T   RL093   COMP  0-B
0057     28 0.000540 +-0.000054   NI  T   RL093   COMP  0-B
0057     29 0.003750 +-0.000375   CU  T   RL093   COMP  0-B
0057     30 0.094110 +-0.009411   ZN  T   RL093   COMP  0-B
0057     33 0.159920 +-0.015992   AS  T   RL093   COMP  0-B
0057     34 0.000660 +-0.000066   SE  T   RL093   COMP  0-B
0057     35 0.012350 +-0.001235   BR  T   RL093   COMP  0-B
0057     38 0.000160 +-0.000040   SR  T   RL093   COMP  0-B
0057     46 0.003540 +-0.000354   PD  T   RL093   COMP  0-B
0057     47 0.001090 +-0.000109   AG  T   RL093   COMP  0-B
0057     48 0.004540 +-0.000454   CD  T   RL093   COMP  0-B
0057     49 0.001570 +-0.000157   IN  T   RL093   COMP  0-B
0057     50 0.016620 +-0.001662   SN  T   RL093   COMP  0-B
0057     51 0.196310 +-0.019631   SB  T   RL093   COMP  0-B
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0057     56 0.000480 +-0.000300   BA  T  RL093  COMP 0-B
0057     80 0.000860 +-0.000090   HG  T  RL093  COMP 0-B
0057     82 0.176560 +-0.017656   PB  T  RL093  COMP 0-B
0058     13 0.017070 +-0.001707   AL  C  RS467  0-C
0058     14 0.099310 +-0.009931   SI  C  RS467  0-C
0058     15 0.003120 +-0.000312   P   C  RS467  0-C
0058     16 0.051120 +-0.006010   S   C  RS467  0-C
0058     17 0.000000 +-0.000420   CL  C  RS467  0-C
0058     19 0.003990 +-0.000399   K   C  RS467  0-C
0058     20 0.004150 +-0.000415   CA  C  RS467  0-C
0058     22 0.002550 +-0.000255   TI  C  RS467  0-C
0058     23 0.000420 +-0.000042   V   C  RS467  0-C
0058     24 0.000720 +-0.000072   CR  C  RS467  0-C
0058     25 0.005960 +-0.000596   MN  C  RS467  0-C
0058     26 0.189500 +-0.018950   FE  C  RS467  0-C
0058     28 0.000720 +-0.000072   NI  C  RS467  0-C
0058     29 0.008660 +-0.000866   CU  C  RS467  0-C
0058     30 0.126180 +-0.012618   ZN  C  RS467  0-C
0058     33 0.003230 +-0.000470   AS  C  RS467  0-C
0058     34 0.000090 +-0.000030   SE  C  RS467  0-C
0058     35 0.000420 +-0.000042   BR  C  RS467  0-C
0058     38 0.007860 +-0.000786   SR  C  RS467  0-C
0058     46 0.000500 +-0.000060   PD  C  RS467  0-C
0058     47 0.001030 +-0.000103   AG  C  RS467  0-C
0058     48 0.002460 +-0.000246   CD  C  RS467  0-C
0058     49 0.000280 +-0.000100   IN  C  RS467  0-C
0058     50 0.000630 +-0.000120   SN  C  RS467  0-C
0058     51 0.001510 +-0.000260   SB  C  RS467  0-C
0058     56 0.000350 +-0.000530   BA  C  RS467  0-C
0058     80 0.000020 +-0.000060   HG  C  RS467  0-C
0058     82 0.133930 +-0.013393   PB  C  RS467  0-C
0059     13 0.017150 +-0.001715   AL  C  RS469  0-D
0059     14 0.055830 +-0.005583   SI  C  RS469  0-D
0059     15 0.004910 +-0.000491   P   C  RS469  0-D
0059     16 0.152040 +-0.015204   S   C  RS469  0-D
0059     17 0.000000 +-0.000560   CL  C  RS469  0-D
0059     19 0.003090 +-0.000309   K   C  RS469  0-D
0059     20 0.007230 +-0.000723   CA  C  RS469  0-D
0059     22 0.001850 +-0.000185   TI  C  RS469  0-D
0059     23 0.000340 +-0.000034   V   C  RS469  0-D
0059     24 0.000690 +-0.000069   CR  C  RS469  0-D
0059     25 0.001650 +-0.000165   MN  C  RS469  0-D
0059     26 0.194830 +-0.019483   FE  C  RS469  0-D
0059     28 0.000800 +-0.000080   NI  C  RS469  0-D
0059     29 0.044070 +-0.004407   CU  C  RS469  0-D
0059     30 0.116640 +-0.011664   ZN  C  RS469  0-D
0059     33 0.002380 +-0.000360   AS  C  RS469  0-D
0059     34 0.000140 +-0.000030   SE  C  RS469  0-D
0059     35 0.000390 +-0.000039   BR  C  RS469  0-D
0059     38 0.001170 +-0.000117   SR  C  RS469  0-D
0059     46 0.000800 +-0.000080   PD  C  RS469  0-D
0059     47 0.002790 +-0.000279   AG  C  RS469  0-D
0059     48 0.001670 +-0.000167   CD  C  RS469  0-D
0059     49 0.000380 +-0.000060   IN  C  RS469  0-D
0059     50 0.001970 +-0.000197   SN  C  RS469  0-D
0059     51 0.002150 +-0.000215   SB  C  RS469  0-D
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0059     56 0.000000 +-0.000280   BA   C   RS469   0-D
0059     80 0.000170 +-0.000050   HG   C   RS469   0-D
0059     82 0.117080 +-0.011708   PB   C   RS469   0-D
0060     13 0.012180 +-0.001218   AL   C   RS471   0-E
0060     14 0.040720 +-0.004072   SI   C   RS471   0-E
0060     15 0.003860 +-0.000386   P    C   RS471   0-E
0060     16 0.088490 +-0.008849   S    C   RS471   0-E
0060     17 0.000000 +-0.000460   CL   C   RS471   0-E
0060     19 0.005060 +-0.000506   K    C   RS471   0-E
0060     20 0.041470 +-0.004147   CA   C   RS471   0-E
0060     22 0.002120 +-0.000212   TI   C   RS471   0-E
0060     23 0.000450 +-0.000045   V    C   RS471   0-E
0060     24 0.000570 +-0.000057   CR   C   RS471   0-E
0060     25 0.008370 +-0.000837   MN   C   RS471   0-E
0060     26 0.137250 +-0.013725   FE   C   RS471   0-E
0060     28 0.001280 +-0.000128   NI   C   RS471   0-E
0060     29 0.019630 +-0.001963   CU   C   RS471   0-E
0060     30 0.122460 +-0.012246   ZN   C   RS471   0-E
0060     33 0.002580 +-0.000430   AS   C   RS471   0-E
0060     34 0.000130 +-0.000030   SE   C   RS471   0-E
0060     35 0.000460 +-0.000046   BR   C   RS471   0-E
0060     38 0.006160 +-0.000616   SR   C   RS471   0-E
0060     46 0.000630 +-0.000070   PD   C   RS471   0-E
0060     47 0.001870 +-0.000187   AG   C   RS471   0-E
0060     48 0.003640 +-0.000364   CD   C   RS471   0-E
0060     49 0.000510 +-0.000090   IN   C   RS471   0-E
0060     50 0.003810 +-0.000381   SN   C   RS471   0-E
0060     51 0.000760 +-0.000210   SB   C   RS471   0-E
0060     56 0.001490 +-0.000490   BA   C   RS471   0-E
0060     80 0.000390 +-0.000070   HG   C   RS471   0-E
0060     82 0.131000 +-0.013100   PB   C   RS471   0-E
0061     13 0.123050 +-0.012305   AL   C   RS521   0-F
0061     14 0.232000 +-0.023200   SI   C   RS521   0-F
0061     15 0.002450 +-0.000245   P    C   RS521   0-F
0061     16 0.023750 +-0.002375   S    C   RS521   0-F
0061     17 0.000000 +-0.000180   CL   C   RS521   0-F
0061     19 0.035610 +-0.003561   K    C   RS521   0-F
0061     20 0.004710 +-0.000471   CA   C   RS521   0-F
0061     22 0.002770 +-0.000277   TI   C   RS521   0-F
0061     23 0.000260 +-0.000026   Y    C   RS521   0-F
0061     24 0.000290 +-0.000029   CR   C   RS521   0-F
0061     25 0.005490 +-0.000549   MN   C   RS521   0-F
0061     26 0.084080 +-0.008408   FE   C   RS521   0-F
0061     28 0.000100 +-0.000020   NI   C   RS521   0-F
0061     29 0.004680 +-0.000468   CU   C   RS521   0-F
0061     30 0.007210 +-0.000721   ZN   C   RS521   0-F
0061     33 0.018640 +-0.001864   AS   C   RS521   0-F
0061     34 0.000080 +-0.000020   SE   C   RS521   0-F
0061     35 0.001610 +-0.000161   BR   C   RS521   0-F
0061     38 0.000220 +-0.000022   SR   C   RS521   0-F
0061     46 0.000000 +-0.000050   PD   C   RS521   0-F
0061     47 0.000400 +-0.000080   AG   C   RS521   0-F
0061     48 0.000380 +-0.000110   CD   C   RS521   0-F
0061     49 0.000000 +-0.000100   IN   C   RS521   0-F
0061     50 0.000360 +-0.000120   SN   C   RS521   0-F
0061     51 0.000440 +-0.000230   SB   C   RS521   0-F
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0061     56 0.000000 +-0.000590   BA   C   RS521   O-F
0061     80 0.000090 +-0.000030   HG   C   RS521   O-F
0061     82 0.036040 +-0.003604   PB   C   RS521   O-F
0062     13 0.035550 +-0.003555   AL   C   RS475   O-G
0062     14 0.088520 +-0.008852   SI   C   RS475   O-G
0062     15 0.004660 +-0.000466   P    C   RS475   O-G
0062     16 0.096880 +-0.010140   S    C   RS475   O-G
0062     17 0.000000 +-0.000640   CL   C   RS475   O-G
0062     19 0.007540 +-0.000754   K    C   RS475   O-G
0062     20 0.005150 +-0.000515   CA   C   RS475   O-G
0062     22 0.004210 +-0.000421   TI   C   RS475   O-G
0062     23 0.000290 +-0.000030   V    C   RS475   O-G
0062     24 0.000630 +-0.000063   CR   C   RS475   O-G
0062     25 0.017810 +-0.001781   MN   C   RS475   O-G
0062     26 0.146440 +-0.014644   FE   C   RS475   O-G
0062     28 0.000480 +-0.000048   NI   C   RS475   O-G
0062     29 0.013480 +-0.001348   CU   C   RS475   O-G
0062     30 0.041220 +-0.004122   ZN   C   RS475   O-G
0062     33 0.001910 +-0.000560   AS   C   RS475   O-G
0062     34 0.000150 +-0.000050   SE   C   RS475   O-G
0062     35 0.000610 +-0.000061   BR   C   RS475   O-G
0062     38 0.000170 +-0.000050   SR   C   RS475   O-G
0062     46 0.001930 +-0.000193   PD   C   RS475   O-G
0062     47 0.011720 +-0.001172   AG   C   RS475   O-G
0062     48 0.004490 +-0.000449   CD   C   RS475   O-G
0062     49 0.000350 +-0.000050   IN   C   RS475   O-G
0062     50 0.003290 +-0.000329   SN   C   RS475   O-G
0062     51 0.012190 +-0.001219   SB   C   RS475   O-G
0062     56 0.001480 +-0.000220   BA   C   RS475   O-G
0062     80 0.000000 +-0.000080   HG   C   RS475   O-G
0062     82 0.220170 +-0.022017   PB   C   RS475   O-G
0063     13 0.035910 +-0.003591   AL   C   RS523   O-H
0063     14 0.086500 +-0.008650   SI   C   RS523   O-H
0063     15 0.006100 +-0.000610   P    C   RS523   O-H
0063     16 0.143520 +-0.014352   S    C   RS523   O-H
0063     17 0.000000 +-0.000780   CL   C   RS523   O-H
0063     19 0.005680 +-0.000568   K    C   RS523   O-H
0063     20 0.020070 +-0.002007   CA   C   RS523   O-H
0063     22 0.002360 +-0.000236   TI   C   RS523   O-H
0063     23 0.000090 +-0.000030   V    C   RS523   O-H
0063     24 0.000230 +-0.000030   CR   C   RS523   O-H
0063     25 0.001800 +-0.000180   MN   C   RS523   O-H
0063     26 0.045520 +-0.004552   FE   C   RS523   O-H
0063     28 0.000700 +-0.000070   NI   C   RS523   O-H
0063     29 0.091190 +-0.009119   CU   C   RS523   O-H
0063     30 0.044380 +-0.004438   ZN   C   RS523   O-H
0063     33 0.068540 +-0.006854   AS   C   RS523   O-H
0063     34 0.000310 +-0.000070   SE   C   RS523   O-H
0063     35 0.005810 +-0.000581   BR   C   RS523   O-H
0063     38 0.000290 +-0.000060   SR   C   RS523   O-H
0063     46 0.000260 +-0.000140   PD   C   RS523   O-H
0063     47 0.006110 +-0.000611   AG   C   RS523   O-H
0063     48 0.001050 +-0.000260   CD   C   RS523   O-H
0063     49 0.000600 +-0.000260   IN   C   RS523   O-H
0063     50 0.002310 +-0.000340   SN   C   RS523   O-H
0063     51 0.070590 +-0.007059   SB   C   RS523   O-H
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0063     56 0.000230 +-0.001400   BA  C  RS523  0-H
0063     80 0.000550 +-0.000130   HG  C  RS523  0-H
0063     82 0.204350 +-0.020435   PB  C  RS523  0-H
0064     13 0.013620 +-0.001362   AL  C  RS479  0-I
0064     14 0.025600 +-0.002560   SI  C  RS479  0-I
0064     15 0.005970 +-0.000597   P   C  RS479  0-I
0064     16 0.120360 +-0.023340   S   C  RS479  0-I
0064     17 0.000000 +-0.001470   CL  C  RS479  0-I
0064     19 0.001240 +-0.000124   K   C  RS479  0-I
0064     20 0.011070 +-0.001107   CA  C  RS479  0-I
0064     22 0.000370 +-0.000070   TI  C  RS479  0-I
0064     23 0.000000 +-0.000020   Y   C  RS479  0-I
0064     24 0.000280 +-0.000028   CR  C  RS479  0-I
0064     25 0.000440 +-0.000044   MN  C  RS479  0-I
0064     26 0.049070 +-0.004907   FE  C  RS479  0-I
0064     28 0.002210 +-0.000221   NI  C  RS479  0-I
0064     29 0.011280 +-0.001128   CU  C  RS479  0-I
0064     30 0.013650 +-0.001365   ZN  C  RS479  0-I
0064     33 0.000000 +-0.001350   AS  C  RS479  0-I
0064     34 0.000260 +-0.000120   SE  C  RS479  0-I
0064     35 0.000470 +-0.000110   BR  C  RS479  0-I
0064     38 0.000050 +-0.000120   SR  C  RS479  0-I
0064     46 0.006370 +-0.000637   PD  C  RS479  0-I
0064     47 0.001280 +-0.000128   AG  C  RS479  0-I
0064     48 0.015640 +-0.001564   CD  C  RS479  0-I
0064     49 0.000850 +-0.000085   IN  C  RS479  0-I
0064     50 0.008620 +-0.000862   SN  C  RS479  0-I
0064     51 0.000180 +-0.000110   SB  C  RS479  0-I
0064     56 0.002830 +-0.000290   BA  C  RS479  0-I
0064     80 0.000000 +-0.000200   HG  C  RS479  0-I
0064     82 0.562330 +-0.056233   PB  C  RS479  0-I
0065     13 0.008060 +-0.000806   AL  C  RS482  0-J
0065     14 0.015360 +-0.001536   SI  C  RS482  0-J
0065     15 0.004780 +-0.000478   P   C  RS482  0-J
0065     16 0.149330 +-0.014933   S   C  RS482  0-J
0065     17 0.000000 +-0.000490   CL  C  RS482  0-J
0065     19 0.004930 +-0.000493   K   C  RS482  0-J
0065     20 0.036650 +-0.003665   CA  C  RS482  0-J
0065     22 0.003020 +-0.000302   TI  C  RS482  0-J
0065     23 0.000100 +-0.000010   Y   C  RS482  0-J
0065     24 0.000450 +-0.000045   CR  C  RS482  0-J
0065     25 0.001720 +-0.000172   MN  C  RS482  0-J
0065     26 0.115380 +-0.011538   FE  C  RS482  0-J
0065     28 0.001150 +-0.000115   NI  C  RS482  0-J
0065     29 0.234500 +-0.023450   CU  C  RS482  0-J
0065     30 0.021500 +-0.002150   ZN  C  RS482  0-J
0065     33 0.019930 +-0.001993   AS  C  RS482  0-J
0065     34 0.000100 +-0.000020   SE  C  RS482  0-J
0065     35 0.001820 +-0.000182   BR  C  RS482  0-J
0065     38 0.000470 +-0.000047   SR  C  RS482  0-J
0065     46 0.000410 +-0.000050   PD  C  RS482  0-J
0065     47 0.025850 +-0.002585   AG  C  RS482  0-J
0065     48 0.000830 +-0.000090   CD  C  RS482  0-J
0065     49 0.000640 +-0.000090   IN  C  RS482  0-J
0065     50 0.004580 +-0.000458   SN  C  RS482  0-J
0065     51 0.157610 +-0.015761   SB  C  RS482  0-J
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0065     56 0.000530 +-0.000370   BA  C   RS482   0-J
0065     80 0.000460 +-0.000046   HG  C   RS482   0-J
0065     82 0.045720 +-0.004572   PB  C   RS482   0-J
0066     13 0.005270 +-0.000550   AL  C   RS484   0-K
0066     14 0.012200 +-0.001220   SI  C   RS484   0-K
0066     15 0.004950 +-0.000495   P   C   RS484   0-K
0066     16 0.109860 +-0.010986   S   C   RS484   0-K
0066     17 0.000000 +-0.000730   CL  C   RS484   0-K
0066     19 0.002980 +-0.000298   K   C   RS484   0-K
0066     20 0.034390 +-0.003439   CA  C   RS484   0-K
0066     22 0.000840 +-0.000084   TI  C   RS484   0-K
0066     23 0.000050 +-0.000020   Y   C   RS484   0-K
0066     24 0.000150 +-0.000020   CR  C   RS484   0-K
0066     25 0.000350 +-0.000035   MN  C   RS484   0-K
0066     26 0.021020 +-0.002102   FE  C   RS484   0-K
0066     28 0.000630 +-0.000063   NI  C   RS484   0-K
0066     29 0.042650 +-0.004265   CU  C   RS484   0-K
0066     30 0.027230 +-0.002723   ZN  C   RS484   0-K
0066     33 0.062410 +-0.006241   AS  C   RS484   0-K
0066     34 0.000780 +-0.000080   SE  C   RS484   0-K
0066     35 0.005280 +-0.000528   BR  C   RS484   0-K
0066     38 0.000130 +-0.000060   SR  C   RS484   0-K
0066     46 0.000640 +-0.000110   PD  C   RS484   0-K
0066     47 0.003850 +-0.000385   AG  C   RS484   0-K
0066     48 0.005640 +-0.000564   CD  C   RS484   0-K
0066     49 0.000600 +-0.000210   IN  C   RS484   0-K
0066     50 0.006530 +-0.000653   SN  C   RS484   0-K
0066     51 0.032980 +-0.003298   SB  C   RS484   0-K
0066     56 0.001200 +-0.001070   BA  C   RS484   0-K
0066     80 0.000250 +-0.000120   HG  C   RS484   0-K
0066     82 0.222360 +-0.022236   PB  C   RS484   0-K
0067     13 0.010940 +-0.001094   AL  C   RS486   0-L
0067     14 0.025160 +-0.002516   SI  C   RS486   0-L
0067     15 0.006920 +-0.000692   P   C   RS486   0-L
0067     16 0.134450 +-0.023340   S   C   RS486   0-L
0067     17 0.000000 +-0.001520   CL  C   RS486   0-L
0067     19 0.002320 +-0.000232   K   C   RS486   0-L
0067     20 0.017750 +-0.001775   CA  C   RS486   0-L
0067     22 0.000770 +-0.000077   TI  C   RS486   0-L
0067     23 0.000160 +-0.000020   Y   C   RS486   0-L
0067     24 0.000210 +-0.000021   CR  C   RS486   0-L
0067     25 0.000540 +-0.000054   MN  C   RS486   0-L
0067     26 0.017070 +-0.001707   FE  C   RS486   0-L
0067     28 0.001380 +-0.000138   NI  C   RS486   0-L
0067     29 0.050270 +-0.005027   CU  C   RS486   0-L
0067     30 0.016470 +-0.001647   ZN  C   RS486   0-L
0067     33 0.028510 +-0.002851   AS  C   RS486   0-L
0067     34 0.000470 +-0.000130   SE  C   RS486   0-L
0067     35 0.003130 +-0.000313   BR  C   RS486   0-L
0067     38 0.000100 +-0.000130   SR  C   RS486   0-L
0067     46 0.002050 +-0.000205   PD  C   RS486   0-L
0067     47 0.004800 +-0.000480   AG  C   RS486   0-L
0067     48 0.006250 +-0.000625   CD  C   RS486   0-L
0067     49 0.000610 +-0.000160   IN  C   RS486   0-L
0067     50 0.005470 +-0.000547   SN  C   RS486   0-L
0067     51 0.019120 +-0.001912   SB  C   RS486   0-L
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0067     56 0.001260 +-0.000810   BA   C   RS486   0-L
0067     80 0.000000 +-0.000220   HG   C   RS486   0-L
0067     82 0.561560 +-0.056156   PB   C   RS486   0-L
0068     13 0.011130 +-0.001113   AL   C   RS489   0-M
0068     14 0.025790 +-0.002579   SI   C   RS489   0-M
0068     15 0.005770 +-0.000577   P    C   RS489   0-M
0068     16 0.136060 +-0.017300   S    C   RS489   0-M
0068     17 0.000000 +-0.001100   CL   C   RS489   0-M
0068     19 0.001180 +-0.000118   K    C   RS489   0-M
0068     20 0.007540 +-0.000754   CA   C   RS489   0-M
0068     22 0.000850 +-0.000085   TI   C   RS489   0-M
0068     23 0.000140 +-0.000014   V    C   RS489   0-M
0068     24 0.000210 +-0.000021   CR   C   RS489   0-M
0068     25 0.001430 +-0.000143   MN   C   RS489   0-M
0068     26 0.028390 +-0.002839   FE   C   RS489   0-M
0068     28 0.000890 +-0.000089   NI   C   RS489   0-M
0068     29 0.083230 +-0.008323   CU   C   RS489   0-M
0068     30 0.056930 +-0.005693   ZN   C   RS489   0-M
0068     33 0.045120 +-0.004512   AS   C   RS489   0-M
0068     34 0.000350 +-0.000090   SE   C   RS489   0-M
0068     35 0.004330 +-0.000433   BR   C   RS489   0-M
0068     38 0.000130 +-0.000090   SR   C   RS489   0-M
0068     46 0.002690 +-0.000269   PD   C   RS489   0-M
0068     47 0.003940 +-0.000394   AG   C   RS489   0-M
0068     48 0.005340 +-0.000534   CD   C   RS489   0-M
0068     49 0.000590 +-0.000100   IN   C   RS489   0-M
0068     50 0.003580 +-0.000358   SN   C   RS489   0-M
0068     51 0.023260 +-0.002326   SB   C   RS489   0-M
0068     56 0.000810 +-0.000430   BA   C   RS489   0-M
0068     80 0.000300 +-0.000150   HG   C   RS489   0-M
0068     82 0.390910 +-0.039091   PB   C   RS489   0-M
0069     13 0.036030 +-0.003603   AL   C   RS492   0-N
0069     14 0.100900 +-0.010090   SI   C   RS492   0-N
0069     15 0.004980 +-0.000498   P    C   RS492   0-N
0069     16 0.086410 +-0.016450   S    C   RS492   0-N
0069     17 0.000000 +-0.001040   CL   C   RS492   0-N
0069     19 0.006190 +-0.000619   K    C   RS492   0-N
0069     20 0.005930 +-0.000593   CA   C   RS492   0-N
0069     22 0.001370 +-0.000137   TI   C   RS492   0-N
0069     23 0.000090 +-0.000030   V    C   RS492   0-N
0069     24 0.000290 +-0.000029   CR   C   RS492   0-N
0069     25 0.001640 +-0.000164   MN   C   RS492   0-N
0069     26 0.056390 +-0.005639   FE   C   RS492   0-N
0069     28 0.000530 +-0.000053   NI   C   RS492   0-N
0069     29 0.011240 +-0.001124   CU   C   RS492   0-N
0069     30 0.034880 +-0.003488   ZN   C   RS492   0-N
0069     33 0.015800 +-0.001580   AS   C   RS492   0-N
0069     34 0.000270 +-0.000080   SE   C   RS492   0-N
0069     35 0.002070 +-0.000207   BR   C   RS492   0-N
0069     38 0.000070 +-0.000090   SR   C   RS492   0-N
0069     46 0.004200 +-0.000420   PD   C   RS492   0-N
0069     47 0.004410 +-0.000441   AG   C   RS492   0-N
0069     48 0.008640 +-0.000864   CD   C   RS492   0-N
0069     49 0.000710 +-0.000071   IN   C   RS492   0-N
0069     50 0.005150 +-0.000515   SN   C   RS492   0-N
0069     51 0.022220 +-0.002222   SB   C   RS492   0-N
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0069     56 0.001330 +-0.000250   BA   C   RS492   0-N
0069     80 0.000000 +-0.000150   HG   C   RS492   0-N
0069     82 0.399530 +-0.039953   PB   C   RS492   0-N
0070     13 0.006500 +-0.000650   AL   C   HD376   D & L BUILDING
0070     14 0.029000 +-0.004000   SI   C   HD376   D & L BUILDING
0070     15 0.003600 +-0.000400   P    C   HD376   D & L BUILDING
0070     16 0.060000 +-0.020000   S    C   HD376   D & L BUILDING
0070     17 0.010000 +-0.003000   CL   C   HD376   D & L BUILDING
0070     19 0.002400 +-0.000240   K    C   HD376   D & L BUILDING
0070     20 0.020000 +-0.002000   CA   C   HD376   D & L BUILDING
0070     22 0.000400 +-0.000100   TI   C   HD376   D & L BUILDING
0070     23 0.000020 +-0.000010   V    C   HD376   D & L BUILDING
0070     24 0.000380 +-0.000038   CR   C   HD376   D & L BUILDING
0070     25 0.003000 +-0.001000   MN   C   HD376   D & L BUILDING
0070     26 0.048000 +-0.005000   FE   C   HD376   D & L BUILDING
0070     28 0.000830 +-0.000083   NI   C   HD376   D & L BUILDING
0070     29 0.016590 +-0.001659   CU   C   HD376   D & L BUILDING
0070     30 0.042430 +-0.004243   ZN   C   HD376   D & L BUILDING
0070     33 0.055320 +-0.005532   AS   C   HD376   D & L BUILDING
0070     34 0.000840 +-0.000084   SE   C   HD376   D & L BUILDING
0070     35 0.001000 +-0.000500   BR   C   HD376   D & L BUILDING
0070     38 0.001840 +-0.000184   SR   C   HD376   D & L BUILDING
0070     46 0.007460 +-0.000746   PD   C   HD376   D & L BUILDING
0070     47 0.003780 +-0.000378   AG   C   HD376   D & L BUILDING
0070     48 0.028840 +-0.002884   CD   C   HD376   D & L BUILDING
0070     49 0.000050 +-0.000010   IN   C   HD376   D & L BUILDING
0070     50 0.006800 +-0.000680   SN   C   HD376   D & L BUILDING
0070     51 0.018330 +-0.001833   SB   C   HD376   D & L BUILDING
0070     56 0.002570 +-0.000257   BA   C   HD375   D & L BUILDING
0070     80 0.001870 +-0.000187   HG   C   HD376   D & L BUILDING
0070     82 0.279150 +-0.027915   PB   C   HD376   D & L BUILDING
0071     13 0.005000 +-0.001000   AL   C   HD380   NEW DEAL
0071     14 0.018000 +-0.002000   SI   C   HD380   NEW DEAL
0071     15 0.002000 +-0.000500   P    C   HD380   NEW DEAL
0071     16 0.040000 +-0.010000   S    C   HD380   NEW DEAL
0071     17 0.001600 +-0.000400   CL   C   HD380   NEW DEAL
0071     19 0.002500 +-0.000300   K    C   HD380   NEW DEAL
0071     20 0.021000 +-0.002100   CA   C   HD380   NEW DEAL
0071     22 0.001000 +-0.003000   TI   C   HD380   NEW DEAL
0071     23 0.000050 +-0.000020   V    C   HD380   NEW DEAL
0071     24 0.001070 +-0.000107   CR   C   HD380   NEW DEAL
0071     25 0.002800 +-0.000400   MN   C   HD380   NEW DEAL
0071     26 0.053000 +-0.005300   FE   C   HD380   NEW DEAL
0071     28 0.000500 +-0.000100   NI   C   HD380   NEW DEAL
0071     29 0.016000 +-0.002000   CU   C   HD380   NEW DEAL
0071     30 0.038170 +-0.003817   ZN   C   HD380   NEW DEAL
0071     33 0.007370 +-0.000737   AS   C   HD380   NEW DEAL
0071     34 0.000210 +-0.000030   SE   C   HD380   NEW DEAL
0071     35 0.000400 +-0.000040   BR   C   HD380   NEW DEAL
0071     38 0.001010 +-0.000101   SR   C   HD380   NEW DEAL
0071     46 0.000850 +-0.000085   PD   C   HD380   NEW DEAL
0071     47 0.001590 +-0.000159   AG   C   HD380   NEW DEAL
0071     48 0.005360 +-0.000536   CD   C   HD380   NEW DEAL
0071     49 0.000110 +-0.000020   IN   C   HD380   NEW DEAL
0071     50 0.001600 +-0.000160   SN   C   HD380   NEW DEAL
0071     51 0.007170 +-0.000717   SB   C   HD380   NEW DEAL
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0071      56 0.000830 +-0.000210   BA  C  HD380   NEW DEAL
0071      80 0.000330 +-0.000060   HG  C  HD380   NEW DEAL
0071      82 0.137860 +-0.013786   PB  C  HD380   NEW DEAL
0072      13 0.010500 +-0.001050   AL  T  HT289   ZINC PLANT
0072      14 0.027180 +-0.002718   SI  T  HT289   ZINC PLANT
0072      15 0.000990 +-0.000099   P   T  HT289   ZINC PLANT
0072      16 0.004930 +-0.003710   S   T  HT289   ZINC PLANT
0072      17 0.000000 +-0.000250   CL  T  HT289   ZINC PLANT
0072      19 0.014150 +-0.001415   K   T  HT289   ZINC PLANT
0072      20 0.004890 +-0.000489   CA  T  HT289   ZINC PLANT
0072      22 0.000650 +-0.000065   TI  T  HT289   ZINC PLANT
0072      23 0.000090 +-0.000010   V   T  HT289   ZINC PLANT
0072      24 0.000130 +-0.000013   CR  T  HT289   ZINC PLANT
0072      25 0.000490 +-0.000049   MN  T  HT289   ZINC PLANT
0072      26 0.012260 +-0.001226   FE  T  HT289   ZINC PLANT
0072      28 0.000420 +-0.000042   NI  T  HT289   ZINC PLANT
0072      29 0.002560 +-0.000256   CU  T  HT289   ZINC PLANT
0072      30 0.181890 +-0.018189   ZN  T  HT289   ZINC PLANT
0072      33 0.004980 +-0.000498   AS  T  HT289   ZINC PLANT
0072      34 0.000190 +-0.000020   SE  T  HT289   ZINC PLANT
0072      35 0.000710 +-0.000071   BR  T  HT289   ZINC PLANT
0072      38 0.000260 +-0.000030   SR  T  HT289   ZINC PLANT
0072      46 0.001220 +-0.000122   PD  T  HT289   ZINC PLANT
0072      47 0.000450 +-0.000045   AG  T  HT289   ZINC PLANT
0072      48 0.001420 +-0.000142   CD  T  HT289   ZINC PLANT
0072      49 0.000300 +-0.000040   IN  T  HT289   ZINC PLANT
0072      50 0.003530 +-0.000353   SN  T  HT289   ZINC PLANT
0072      51 0.001490 +-0.000149   SB  T  HT289   ZINC PLANT
0072      56 0.000210 +-0.000160   BA  T  HT289   ZINC PLANT
0072      80 0.000130 +-0.000040   HG  T  HT289   ZINC PLANT
0072      82 0.090470 +-0.009047   PB  T  HT289   ZINC PLANT
0073      13 0.005000 +-0.001000   AL  C  HD394   DROSS BLDG
0073      14 0.014600 +-0.001460   SI  C  HD394   DROSS BLDG
0073      15 0.001410 +-0.000141   P   C  HD394   DROSS BLDG
0073      16 0.015340 +-0.005330   S   C  HD394   DROSS BLDG
0073      17 0.000000 +-0.000340   CL  C  HD394   DROSS BLDG
0073      19 0.002790 +-0.000279   K   C  HD394   DROSS BLDG
0073      20 0.011600 +-0.001160   CA  C  HD394   DROSS BLDG
0073      22 0.000560 +-0.000056   TI  C  HD394   DROSS BLDG
0073      23 0.000070 +-0.000010   V   C  HD394   DROSS BLDG
0073      24 0.000130 +-0.000013   CR  C  HD394   DROSS BLDG
0073      25 0.000390 +-0.000039   MN  C  HD394   DROSS BLDG
0073      26 0.007520 +-0.000752   FE  C  HD394   DROSS BLDG
0073      28 0.000760 +-0.000076   NI  C  HD394   DROSS BLDG
0073      29 0.018730 +-0.001873   CU  C  HD394   DROSS BLDG
0073      30 0.009630 +-0.000963   ZN  C  HD394   DROSS BLDG
0073      33 0.200000 +-0.020000   AS  C  HD394   DROSS BLDG
0073      34 0.000840 +-0.000084   SE  C  HD394   DROSS BLDG
0073      35 0.000070 +-0.000020   BR  C  HD394   DROSS BLDG
0073      38 0.000140 +-0.000030   SR  C  HD394   DROSS BLDG
0073      46 0.005040 +-0.000504   PD  C  HD394   DROSS BLDG
0073      47 0.003000 +-0.000300   AG  C  HD394   DROSS BLDG
0073      48 0.008000 +-0.002000   CD  C  HD394   DROSS BLDG
0073      49 0.001910 +-0.000191   IN  C  HD394   DROSS BLDG
0073      50 0.016000 +-0.003000   SN  C  HD394   DROSS BLDG
0073      51 0.020000 +-0.003000   SB  C  HD394   DROSS BLDG
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0073     56 0.000320 +-0.000230   BA   C   HD394   DROSS BLDG
0073     80 0.001070 +-0.000107   HG   C   HD394   DROSS BLDG
0073     82 0.160000 +-0.040000   PB   C   HD394   DROSS BLDG
0074     13 0.015510 +-0.001551   AL   C   HD402   ZINC BAGHOUSE
0074     14 0.050910 +-0.005091   SI   C   HD402   ZINC BAGHOUSE
0074     15 0.002720 +-0.000272   P    C   HD402   ZINC BAGHOUSE
0074     16 0.043080 +-0.005750   S    C   HD402   ZINC BAGHOUSE
0074     17 0.000500 +-0.000500   CL   C   HD402   ZINC BAGHOUSE
0074     19 0.008340 +-0.000834   K    C   HD402   ZINC BAGHOUSE
0074     20 0.010000 +-0.002000   CA   C   HD402   ZINC BAGHOUSE
0074     22 0.000900 +-0.000090   TI   C   HD402   ZINC BAGHOUSE
0074     23 0.000020 +-0.000010   V    C   HD402   ZINC BAGHOUSE
0074     24 0.000140 +-0.000030   CR   C   HD402   ZINC BAGHOUSE
0074     25 0.000500 +-0.000050   MN   C   HD402   ZINC BAGHOUSE
0074     26 0.011500 +-0.001150   FE   C   HD402   ZINC BAGHOUSE
0074     28 0.000980 +-0.000098   NI   C   HD402   ZINC BAGHOUSE
0074     29 0.004980 +-0.000498   CU   C   HD402   ZINC BAGHOUSE
0074     30 0.434780 +-0.043478   ZN   C   HD402   ZINC BAGHOUSE
0074     33 0.014570 +-0.001457   AS   C   HD402   ZINC BAGHOUSE
0074     34 0.000110 +-0.000050   SE   C   HD402   ZINC BAGHOUSE
0074     35 0.000070 +-0.000010   BR   C   HD402   ZINC BAGHOUSE
0074     38 0.000140 +-0.000050   SR   C   HD402   ZINC BAGHOUSE
0074     46 0.000530 +-0.000130   PD   C   HD402   ZINC BAGHOUSE
0074     47 0.000370 +-0.000170   AG   C   HD402   ZINC BAGHOUSE
0074     48 0.000300 +-0.000260   CD   C   HD402   ZINC BAGHOUSE
0074     49 0.000030 +-0.000010   IN   C   HD402   ZINC BAGHOUSE
0074     50 0.007020 +-0.000702   SN   C   HD402   ZINC BAGHOUSE
0074     51 0.004130 +-0.000690   SB   C   HD402   ZINC BAGHOUSE
0074     56 0.000000 +-0.001440   BA   C   HD402   ZINC BAGHOUSE
0074     80 0.000490 +-0.000100   HG   C   HD402   ZINC BAGHOUSE
0074     82 0.124820 +-0.012482   PB   C   HD402   ZINC BAGHOUSE
0075     13 0.002200 +-0.000500   AL   C   HD410   BLAST F UPSET
0075     14 0.005000 +-0.002000   SI   C   HD410   BLAST F UPSET
0075     15 0.006420 +-0.000642   P    C   HD410   BLAST F UPSET
0075     16 0.118850 +-0.014630   S    C   HD410   BLAST F UPSET
0075     17 0.020000 +-0.005000   CL   C   HD410   BLAST F UPSET
0075     19 0.014660 +-0.001466   K    C   HD410   BLAST F UPSET
0075     20 0.005000 +-0.000730   CA   C   HD410   BLAST F UPSET
0075     22 0.000500 +-0.000070   TI   C   HD410   BLAST F UPSET
0075     23 0.000020 +-0.000010   V    C   HD410   BLAST F UPSET
0075     24 0.000200 +-0.000040   CR   C   HD410   BLAST F UPSET
0075     25 0.000040 +-0.000010   MN   C   HD410   BLAST F UPSET
0075     26 0.009420 +-0.000942   FE   C   HD410   BLAST F UPSET
0075     28 0.000570 +-0.000070   NI   C   HD410   BLAST F UPSET
0075     29 0.004140 +-0.000414   CU   C   HD410   BLAST F UPSET
0075     30 0.149180 +-0.014918   ZN   C   HD410   BLAST F UPSET
0075     33 0.015410 +-0.001620   AS   C   HD410   BLAST F UPSET
0075     34 0.000230 +-0.000100   SE   C   HD410   BLAST F UPSET
0075     35 0.000320 +-0.000080   BR   C   HD410   BLAST F UPSET
0075     38 0.000370 +-0.000100   SR   C   HD410   BLAST F UPSET
0075     46 0.000630 +-0.000210   PD   C   HD410   BLAST F UPSET
0075     47 0.000790 +-0.000290   AG   C   HD410   BLAST F UPSET
0075     48 0.078720 +-0.007872   CD   C   HD410   BLAST F UPSET
0075     49 0.000300 +-0.000100   IN   C   HD410   BLAST F UPSET
0075     50 0.002890 +-0.000580   SN   C   HD410   BLAST F UPSET
0075     51 0.002170 +-0.001080   SB   C   HD410   BLAST F UPSET
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0075      56 0.000000 +-0.002300   BA   C   HD410   BLAST F UPSET
0075      80 0.000690 +-0.000200   HG   C   HD410   BLAST F UPSET
0075      82 0.295070 +-0.029507   PB   C   HD410   BLAST F UPSET
0076      13 0.010000 +-0.003000   AL   C   HD386   MAIN SINTER ST
0076      14 0.035000 +-0.010000   SI   C   HD386   MAIN SINTER ST
0076      15 0.007670 +-0.001200   P    C   HD386   MAIN SINTER ST
0076      16 0.150940 +-0.023920   S    C   HD386   MAIN SINTER ST
0076      17 0.009000 +-0.002000   CL   C   HD386   MAIN SINTER ST
0076      19 0.007410 +-0.001120   K    C   HD386   MAIN SINTER ST
0076      20 0.050000 +-0.010000   CA   C   HD386   MAIN SINTER ST
0076      22 0.002030 +-0.000310   TI   C   HD386   MAIN SINTER ST
0076      23 0.000100 +-0.000030   V    C   HD386   MAIN SINTER ST
0076      24 0.000650 +-0.000130   CR   C   HD386   MAIN SINTER ST
0076      25 0.005000 +-0.001000   MN   C   HD386   MAIN SINTER ST
0076      26 0.077610 +-0.010850   FE   C   HD386   MAIN SINTER ST
0076      28 0.000930 +-0.000170   NI   C   HD386   MAIN SINTER ST
0076      29 0.020600 +-0.002890   CU   C   HD386   MAIN SINTER ST
0076      30 0.056780 +-0.007930   ZN   C   HD386   MAIN SINTER ST
0076      33 0.029000 +-0.004290   AS   C   HD386   MAIN SINTER ST
0076      34 0.000850 +-0.000180   SE   C   HD386   MAIN SINTER ST
0076      35 0.000600 +-0.000100   BR   C   HD386   MAIN SINTER ST
0076      38 0.002620 +-0.000400   SR   C   HD386   MAIN SINTER ST
0076      46 0.000220 +-0.000350   PD   C   HD386   MAIN SINTER ST
0076      47 0.002340 +-0.000700   AG   C   HD386   MAIN SINTER ST
0076      48 0.011580 +-0.001920   CD   C   HD386   MAIN SINTER ST
0076      49 0.000150 +-0.000020   IN   C   HD386   MAIN SINTER ST
0076      50 0.001280 +-0.001060   SN   C   HD386   MAIN SINTER ST
0076      51 0.016030 +-0.003120   SB   C   HD386   MAIN SINTER ST
0076      56 0.003750 +-0.004910   BA   C   HD386   MAIN SINTER ST
0076      80 0.001420 +-0.000330   HG   C   HD386   MAIN SINTER ST
0076      82 0.269000 +-0.037500   PB   C   HD386   MAIN SINTER ST
0077      13 0.003000 +-0.001000   AL   C   HD398   ZINC STACK DSS
0077      14 0.007000 +-0.002000   SI   C   HD398   ZINC STACK DSS
0077      15 0.001820 +-0.000182   P    C   HD398   ZINC STACK DSS
0077      16 0.035440 +-0.004490   S    C   HD398   ZINC STACK DSS
0077      17 0.003000 +-0.001000   CL   C   HD398   ZINC STACK DSS
0077      19 0.006130 +-0.000613   K    C   HD398   ZINC STACK DSS
0077      20 0.003000 +-0.001000   CA   C   HD398   ZINC STACK DSS
0077      22 0.000330 +-0.000033   TI   C   HD398   ZINC STACK DSS
0077      23 0.000000 +-0.000001   V    C   HD398   ZINC STACK DSS
0077      24 0.000140 +-0.000020   CR   C   HD398   ZINC STACK DSS
0077      25 0.000100 +-0.000050   MN   C   HD398   ZINC STACK DSS
0077      26 0.003860 +-0.000386   FE   C   HD398   ZINC STACK DSS
0077      28 0.001040 +-0.000104   NI   C   HD398   ZINC STACK DSS
0077      29 0.002730 +-0.000273   CU   C   HD398   ZINC STACK DSS
0077      30 0.591740 +-0.059174   ZN   C   HD398   ZINC STACK DSS
0077      33 0.015250 +-0.001525   AS   C   HD398   ZINC STACK DSS
0077      34 0.000120 +-0.000030   SE   C   HD398   ZINC STACK DSS
0077      35 0.000050 +-0.000010   BR   C   HD398   ZINC STACK DSS
0077      38 0.000090 +-0.000040   SR   C   HD398   ZINC STACK DSS
0077      46 0.000630 +-0.000110   PD   C   HD398   ZINC STACK DSS
0077      47 0.000390 +-0.000120   AG   C   HD398   ZINC STACK DSS
0077      48 0.000620 +-0.000190   CD   C   HD398   ZINC STACK DSS
0077      49 0.000300 +-0.000100   IN   C   HD398   ZINC STACK DSS
0077      50 0.007060 +-0.000706   SN   C   HD398   ZINC STACK DSS
0077      51 0.005870 +-0.000610   SB   C   HD398   ZINC STACK DSS
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0077     56 0.000000 +-0.001000   BA  C  HD398  ZINC STACK DSS
0077     80 0.000610 +-0.000090   HG  C  HD398  ZINC STACK DSS
0077     82 0.096450 +-0.009645   PB  C  HD398  ZINC STACK DSS
0078     13 0.001000 +-0.001000   AL  C  HD412  BAGHOUSE STACK
0078     14 0.002000 +-0.002000   SI  C  HD412  BAGHOUSE STACK
0078     15 0.007300 +-0.000730   P   C  HD412  BAGHOUSE STACK
0078     16 0.131890 +-0.016070   S   C  HD412  BAGHOUSE STACK
0078     17 0.047000 +-0.005000   CL  C  HD412  BAGHOUSE STACK
0078     19 0.021790 +-0.002179   K   C  HD412  BAGHOUSE STACK
0078     20 0.005400 +-0.000700   CA  C  HD412  BAGHOUSE STACK
0078     22 0.000380 +-0.000070   TI  C  HD412  BAGHOUSE STACK
0078     23 0.000040 +-0.000010   V   C  HD412  BAGHOUSE STACK
0078     24 0.000310 +-0.000060   CR  C  HD412  BAGHOUSE STACK
0078     25 0.000080 +-0.000010   MN  C  HD412  BAGHOUSE STACK
0078     26 0.001630 +-0.000210   FE  C  HD412  BAGHOUSE STACK
0078     28 0.000550 +-0.000080   NI  C  HD412  BAGHOUSE STACK
0078     29 0.003550 +-0.000355   CU  C  HD412  BAGHOUSE STACK
0078     30 0.149170 +-0.014917   ZN  C  HD412  BAGHOUSE STACK
0078     33 0.033470 +-0.003347   AS  C  HD412  BAGHOUSE STACK
0078     34 0.000180 +-0.000100   SE  C  HD412  BAGHOUSE STACK
0078     35 0.001200 +-0.000200   BR  C  HD412  BAGHOUSE STACK
0078     38 0.000060 +-0.000110   SR  C  HD412  BAGHOUSE STACK
0078     46 0.000250 +-0.000240   PD  C  HD412  BAGHOUSE STACK
0078     47 0.001460 +-0.000400   AG  C  HD412  BAGHOUSE STACK
0078     48 0.213080 +-0.021308   CD  C  HD412  BAGHOUSE STACK
0078     49 0.000500 +-0.000100   IN  C  HD412  BAGHOUSE STACK
0078     50 0.004820 +-0.000810   SN  C  HD412  BAGHOUSE STACK
0078     51 0.000590 +-0.001510   SB  C  HD412  BAGHOUSE STACK
0078     56 0.002160 +-0.003080   BA  C  HD412  BAGHOUSE STACK
0078     80 0.000250 +-0.000200   HG  C  HD412  BAGHOUSE STACK
0078     82 0.296830 +-0.029683   PB  C  HD412  BAGHOUSE STACK
0079     13 0.004200 +-0.001000   AL  T  HT304  SLAG POUR
0079     14 0.019000 +-0.005000   SI  T  HT304  SLAG POUR
0079     15 0.002660 +-0.000266   P   T  HT304  SLAG POUR
0079     16 0.055230 +-0.005523   S   T  HT304  SLAG POUR
0079     17 0.000900 +-0.000200   CL  T  HT304  SLAG POUR
0079     19 0.041740 +-0.004174   K   T  HT304  SLAG POUR
0079     20 0.026000 +-0.004000   CA  T  HT304  SLAG POUR
0079     22 0.001040 +-0.000104   TI  T  HT304  SLAG POUR
0079     23 0.000010 +-0.000010   V   T  HT304  SLAG POUR
0079     24 0.000200 +-0.000030   CR  T  HT304  SLAG POUR
0079     25 0.001000 +-0.000300   MN  T  HT304  SLAG POUR
0079     26 0.037350 +-0.003735   FE  T  HT304  SLAG POUR
0079     28 0.000660 +-0.000070   NI  T  HT304  SLAG POUR
0079     29 0.003750 +-0.000375   CU  T  HT304  SLAG POUR
0079     30 0.324770 +-0.032477   ZN  T  HT304  SLAG POUR
0079     33 0.051960 +-0.005196   AS  T  HT304  SLAG POUR
0079     34 0.002080 +-0.000208   SE  T  HT304  SLAG POUR
0079     35 0.000040 +-0.000010   BR  T  HT304  SLAG POUR
0079     38 0.000520 +-0.000052   SR  T  HT304  SLAG POUR
0079     46 0.000100 +-0.000080   PD  T  HT304  SLAG POUR
0079     47 0.001300 +-0.000190   AG  T  HT304  SLAG POUR
0079     48 0.001590 +-0.000240   CD  T  HT304  SLAG POUR
0079     49 0.000110 +-0.000040   IN  T  HT304  SLAG POUR
0079     50 0.038490 +-0.003849   SN  T  HT304  SLAG POUR
0079     51 0.016260 +-0.001626   SB  T  HT304  SLAG POUR
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0079     56 0.000000 +-0.001020   BA  T   HT304   SLAG POUR
0079     80 0.000920 +-0.000110   HG  T   HT304   SLAG POUR
0079     82 0.031560 +-0.003156   PB  T   HT304   SLAG POUR
0080     13 0.007000 +-0.002000   AL  C   HD416   ZINC KILN ROOM
0080     14 0.022000 +-0.005000   SI  C   HD416   ZINC KILN ROOM
0080     15 0.001540 +-0.000154   P   C   HD416   ZINC KILN ROOM
0080     16 0.024000 +-0.003180   S   C   HD416   ZINC KILN ROOM
0080     17 0.003000 +-0.001000   CL  C   HD416   ZINC KILN ROOM
0080     19 0.006540 +-0.000654   K   C   HD416   ZINC KILN ROOM
0080     20 0.011000 +-0.002000   CA  C   HD416   ZINC KILN ROOM
0080     22 0.000700 +-0.000070   TI  C   HD416   ZINC KILN ROOM
0080     23 0.000010 +-0.000010   V   C   HD416   ZINC KILN ROOM
0080     24 0.000150 +-0.000020   CR  C   HD416   ZINC KILN ROOM
0080     25 0.000250 +-0.000080   MN  C   HD416   ZINC KILN ROOM
0080     26 0.008620 +-0.000862   FE  C   HD416   ZINC KILN ROOM
0080     28 0.001020 +-0.000102   NI  C   HD416   ZINC KILN ROOM
0080     29 0.004350 +-0.000435   CU  C   HD416   ZINC KILN ROOM
0080     30 0.554940 +-0.055494   ZN  C   HD416   ZINC KILN ROOM
0080     33 0.007570 +-0.000757   AS  C   HD416   ZINC KILN ROOM
0080     34 0.000360 +-0.000036   SE  C   HD416   ZINC KILN ROOM
0080     35 0.000090 +-0.000030   BR  C   HD416   ZINC KILN ROOM
0080     38 0.000090 +-0.000030   SR  C   HD416   ZINC KILN ROOM
0080     46 0.000620 +-0.000080   PD  C   HD416   ZINC KILN ROOM
0080     47 0.000270 +-0.000090   AG  C   HD416   ZINC KILN ROOM
0080     48 0.000990 +-0.000160   CD  C   HD416   ZINC KILN ROOM
0080     49 0.000060 +-0.000020   IN  C   HD416   ZINC KILN ROOM
0080     50 0.003340 +-0.000334   SN  C   HD416   ZINC KILN ROOM
0080     51 0.001910 +-0.000350   SB  C   HD416   ZINC KILN ROOM
0080     56 0.000000 +-0.000690   BA  C   HD416   ZINC KILN ROOM
0080     80 0.000640 +-0.000070   HG  C   HD416   ZINC KILN ROOM
0080     82 0.068360 +-0.006836   PB  C   HD416   ZINC KILN ROOM
0081     13 0.004230 +-0.000450   AL  T   HT301   ZINC KLN DISCH
0081     14 0.005740 +-0.000574   SI  T   HT301   ZINC KLN DISCH
0081     15 0.001880 +-0.000188   P   T   HT301   ZINC KLN DISCH
0081     16 0.032900 +-0.005160   S   T   HT301   ZINC KLN DISCH
0081     17 0.004270 +-0.000570   CL  T   HT301   ZINC KLN DISCH
0081     19 0.006150 +-0.000615   K   T   HT301   ZINC KLN DISCH
0081     20 0.002310 +-0.000231   CA  T   HT301   ZINC KLN DISCH
0081     22 0.000310 +-0.000031   TI  T   HT301   ZINC KLN DISCH
0081     23 0.000110 +-0.000020   V   T   HT301   ZINC KLN DISCH
0081     24 0.000180 +-0.000020   CR  T   HT301   ZINC KLN DISCH
0081     25 0.000210 +-0.000021   MN  T   HT301   ZINC KLN DISCH
0081     26 0.001880 +-0.000188   FE  T   HT301   ZINC KLN DISCH
0081     28 0.001060 +-0.000106   NI  T   HT301   ZINC KLN DISCH
0081     29 0.002540 +-0.000254   CU  T   HT301   ZINC KLN DISCH
0081     30 0.631820 +-0.063182   ZN  T   HT301   ZINC KLN DISCH
0081     33 0.011840 +-0.001184   AS  T   HT301   ZINC KLN DISCH
0081     34 0.003770 +-0.000377   SE  T   HT301   ZINC KLN DISCH
0081     35 0.001200 +-0.000120   BR  T   HT301   ZINC KLN DISCH
0081     38 0.000030 +-0.000040   SR  T   HT301   ZINC KLN DISCH
0081     46 0.000550 +-0.000110   PD  T   HT301   ZINC KLN DISCH
0081     47 0.000360 +-0.000100   AG  T   HT301   ZINC KLN DISCH
0081     48 0.000800 +-0.000180   CD  T   HT301   ZINC KLN DISCH
0081     49 0.000330 +-0.000160   IN  T   HT301   ZINC KLN DISCH
0081     50 0.004240 +-0.000424   SN  T   HT301   ZINC KLN DISCH
0081     51 0.003910 +-0.000530   SB  T   HT301   ZINC KLN DISCH
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0081     56 0.000000 +-0.000780  BA  T  HT301  ZINC KLN DISCH
0081     80 0.000640 +-0.000100  HG  T  HT301  ZINC KLN DISCH
0081     82 0.116640 +-0.011664  PB  T  HT301  ZINC KLN DISCH
0082     13 0.003470 +-0.000347  AL  T  HT305  CU KILN STACK
0082     14 0.003620 +-0.000362  SI  T  HT305  CU KILN STACK
0082     15 0.001930 +-0.000193  P   T  HT305  CU KILN STACK
0082     16 0.044880 +-0.004488  S   T  HT305  CU KILN STACK
0082     17 0.021160 +-0.002116  CL  T  HT305  CU KILN STACK
0082     19 0.002110 +-0.000211  K   T  HT305  CU KILN STACK
0082     20 0.007500 +-0.001000  CA  T  HT305  CU KILN STACK
0082     22 0.000180 +-0.000030  TI  T  HT305  CU KILN STACK
0082     23 0.000000 +-0.000001  V   T  HT305  CU KILN STACK
0082     24 0.000140 +-0.000020  CR  T  HT305  CU KILN STACK
0082     25 0.000010 +-0.000010  MN  T  HT305  CU KILN STACK
0082     26 0.001000 +-0.001000  FE  T  HT305  CU KILN STACK
0082     28 0.002030 +-0.000203  NI  T  HT305  CU KILN STACK
0082     29 0.541510 +-0.054151  CU  T  HT305  CU KILN STACK
0082     30 0.001270 +-0.000390  ZN  T  HT305  CU KILN STACK
0082     33 0.000000 +-0.000080  AS  T  HT305  CU KILN STACK
0082     34 0.000060 +-0.000020  SE  T  HT305  CU KILN STACK
0082     35 0.000180 +-0.000030  BR  T  HT305  CU KILN STACK
0082     38 0.000110 +-0.000020  SR  T  HT305  CU KILN STACK
0082     46 0.000110 +-0.000070  PD  T  HT305  CU KILN STACK
0082     47 0.000010 +-0.000010  AG  T  HT305  CU KILN STACK
0082     48 0.000880 +-0.000160  CD  T  HT305  CU KILN STACK
0082     49 0.000000 +-0.000001  IN  T  HT305  CU KILN STACK
0082     50 0.000090 +-0.000180  SN  T  HT305  CU KILN STACK
0082     51 0.000030 +-0.000010  SB  T  HT305  CU KILN STACK
0082     56 0.000130 +-0.000830  BA  T  HT305  CU KILN STACK
0082     80 0.000060 +-0.000040  HG  T  HT305  CU KILN STACK
0082     82 0.002340 +-0.000234  PB  T  HT305  CU KILN STACK
0083     13 0.000100 +-0.000040  AL  T  HT319  HT319
0083     14 0.000090 +-0.000030  SI  T  HT319  HT319
0083     15 0.000100 +-0.000020  P   T  HT319  HT319
0083     16 0.001150 +-0.000115  S   T  HT319  HT319
0083     17 0.000040 +-0.000020  CL  T  HT319  HT319
0083     19 0.000000 +-0.000010  K   T  HT319  HT319
0083     20 0.000000 +-0.000010  CA  T  HT319  HT319
0083     22 0.000000 +-0.000001  TI  T  HT319  HT319
0083     23 0.000000 +-0.000001  V   T  HT319  HT319
0083     24 0.000000 +-0.000001  CR  T  HT319  HT319
0083     25 0.000000 +-0.000001  MN  T  HT319  HT319
0083     26 0.000000 +-0.000010  FE  T  HT319  HT319
0083     28 0.000000 +-0.000001  NI  T  HT319  HT319
0083     29 0.000710 +-0.000071  CU  T  HT319  HT319
0083     30 0.000000 +-0.000001  ZN  T  HT319  HT319
0083     33 0.000000 +-0.000010  AS  T  HT319  HT319
0083     34 0.000000 +-0.000001  SE  T  HT319  HT319
0083     35 0.000000 +-0.000001  BR  T  HT319  HT319
0083     38 0.000000 +-0.000001  SR  T  HT319  HT319
0083     46 0.000000 +-0.000010  PD  T  HT319  HT319
0083     47 0.000020 +-0.000020  AG  T  HT319  HT319
0083     48 0.000000 +-0.000020  CD  T  HT319  HT319
0083     49 0.000000 +-0.000030  IN  T  HT319  HT319
0083     50 0.000000 +-0.000030  SN  T  HT319  HT319
0083     51 0.000000 +-0.000060  SB  T  HT319  HT319
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0083     56 0.000000 +-0.000150   BA   T  HT319   HT319
0083     80 0.000000 +-0.000001   HG   T  HT319   HT319
0083     82 0.000000 +-0.000010   PB   T  HT319   HT319
0084     13 0.004750 +-0.000490   AL   C  RS415   II-1
0084     14 0.009750 +-0.000710   SI   C  RS415   II-1
0084     15 0.003820 +-0.000290   P    C  RS415   II-1
0084     16 0.010920 +-0.000910   S    C  RS415   II-1
0084     17 0.000110 +-0.000150   CL   C  RS415   II-1
0084     19 0.000600 +-0.000090   K    C  RS415   II-1
0084     20 0.000830 +-0.000100   CA   C  RS415   II-1
0084     22 0.000120 +-0.000030   TI   C  RS415   II-1
0084     23 0.000010 +-0.000020   V    C  RS415   II-1
0084     24 0.000040 +-0.000030   CR   C  RS415   II-1
0084     25 0.000040 +-0.000030   MN   C  RS415   II-1
0084     26 0.001620 +-0.000170   FE   C  RS415   II-1
0084     28 0.000040 +-0.000030   NI   C  RS415   II-1
0084     29 0.002040 +-0.000150   CU   C  RS415   II-1
0084     30 0.003120 +-0.000220   ZN   C  RS415   II-1
0084     33 0.000210 +-0.000070   AS   C  RS415   II-1
0084     34 0.000020 +-0.000020   SE   C  RS415   II-1
0084     35 0.000090 +-0.000030   BR   C  RS415   II-1
0084     38 0.000000 +-0.000040   SR   C  RS415   II-1
0084     46 0.000000 +-0.000150   PD   C  RS415   II-1
0084     47 0.000000 +-0.000190   AG   C  RS415   II-1
0084     48 0.000000 +-0.000280   CD   C  RS415   II-1
0084     49 0.000370 +-0.000320   IN   C  RS415   II-1
0084     50 0.000000 +-0.000380   SN   C  RS415   II-1
0084     51 0.000000 +-0.000700   SB   C  RS415   II-1
0084     56 0.000000 +-0.001830   BA   C  RS415   II-1
0084     80 0.000030 +-0.000050   HG   C  RS415   II-1
0084     82 0.000590 +-0.000120   PB   C  RS415   II-1
0085     16 0.243000 +-0.024300   S    C  SECONDARY SULFATE
0087     13 0.022800 +-0.020635  AL   ORCOM   WEIGHTED AVERAGE OF ORE
0087     14 0.056269 +-0.043521  SI   ORCOM   WEIGHTED AVERAGE OF ORE
0087     15 0.005386 +-0.001090  P    ORCOM   WEIGHTED AVERAGE OF ORE
0087     16 0.123535 +-0.029800  S    ORCOM   WEIGHTED AVERAGE OF ORE
0087     17 0.000000 +-0.000000  CL   ORCOM   WEIGHTED AVERAGE OF ORE
0087     19 0.004861 +-0.005332  K    ORCOM   WEIGHTED AVERAGE OF ORE
0087     20 0.018882 +-0.010992  CA   ORCOM   WEIGHTED AVERAGE OF ORE
0087     22 0.001724 +-0.000931  TI   ORCOM   WEIGHTED AVERAGE OF ORE
0087     23 0.000141 +-0.000109  V    ORCOM   WEIGHTED AVERAGE OF ORE
0087     24 0.000306 +-0.000172  CR   ORCOM   WEIGHTED AVERAGE OF ORE
0087     25 0.002060 +-0.003047  MN   ORCOM   WEIGHTED AVERAGE OF ORE
0087     26 0.064483 +-0.055363  FE   ORCOM   WEIGHTED AVERAGE OF ORE
0087     28 0.001021 +-0.000665  NI   ORCOM   WEIGHTED AVERAGE OF ORE
0087     29 0.070876 +-0.057050  CU   ORCOM   WEIGHTED AVERAGE OF ORE
0087     30 0.043005 +-0.032410  ZN   ORCOM   WEIGHTED AVERAGE OF ORE
0087     33 0.036795 +-0.027447  AS   ORCOM   WEIGHTED AVERAGE OF ORE
0087     34 0.000326 +-0.000214  SE   ORCOM   WEIGHTED AVERAGE OF ORE
0087     35 0.003350 +-0.002195  BR   ORCOM   WEIGHTED AVERAGE OF ORE
0087     38 0.000629 +-0.001542  SR   ORCOM   WEIGHTED AVERAGE OF ORE
0087     46 0.001281 +-0.001603  PD   ORCOM   WEIGHTED AVERAGE OF ORE
0087     47 0.005933 +-0.006221  AG   ORCOM   WEIGHTED AVERAGE OF ORE
0087     48 0.003930 +-0.003700  CD   ORCOM   WEIGHTED AVERAGE OF ORE
0087     49 0.000550 +-0.000173  IN   ORCOM   WEIGHTED AVERAGE OF ORE
0087     50 0.003847 +-0.002142  SN   ORCOM   WEIGHTED AVERAGE OF ORE
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0087     51 0.041780 +-0.043159  SB    ORCOM  WEIGHTED AVERAGE OF ORE
0087     56 0.000771 +-0.000705  BA    ORCOM  WEIGHTED AVERAGE OF ORE
0087     80 0.000265 +-0.000228  HG    ORCOM  WEIGHTED AVERAGE OF ORE
0087     82 0.259591 +-0.168111  PB    ORCOM  WEIGHTED AVERAGE OF ORE
0088     13 0.000740 +-0.000120  AL  C  HD523  WOOD STOVE
0088     14 0.001110 +-0.000100  SI  C  HD523  WOOD STOVE
0088     15 0.000610 +-0.000060  P   C  HD523  WOOD STOVE
0088     16 0.001820 +-0.000190  S   C  HD523  WOOD STOVE
0088     17 0.000770 +-0.000090  CL  C  HD523  WOOD STOVE
0088     19 0.004600 +-0.000260  K   C  HD523  WOOD STOVE
0088     20 0.006890 +-0.000370  CA  C  HD523  WOOD STOVE
0088     22 0.000070 +-0.000010  TI  C  HD523  WOOD STOVE
0088     23 0.000010 +-0.000010  V   C  HD523  WOOD STOVE
0088     24 0.000000 +-0.000010  CR  C  HD523  WOOD STOVE
0088     25 0.000060 +-0.000010  MN  C  HD523  WOOD STOVE
0088     26 0.000070 +-0.000030  FE  C  HD523  WOOD STOVE
0088     28 0.000000 +-0.000010  NI  C  HD523  WOOD STOVE
0088     29 0.000000 +-0.000010  CU  C  HD523  WOOD STOVE
0088     30 0.000480 +-0.000030  ZN  C  HD523  WOOD STOVE
0088     33 0.000060 +-0.000020  AS  C  HD523  WOOD STOVE
0088     34 0.000010 +-0.000010  SE  C  HD523  WOOD STOVE
0088     35 0.000040 +-0.000010  BR  C  HD523  WOOD STOVE
0088     38 0.000020 +-0.000020  SR  C  HD523  WOOD STOVE
0088     46 0.000000 +-0.000050  PD  C  HD523  WOOD STOVE
0088     47 0.000000 +-0.000080  AG  C  HD523  WOOD STOVE
0088     48 0.000000 +-0.000110  CD  C  HD523  WOOD STOVE
0088     49 0.000000 +-0.000120  IN  C  HD523  WOOD STOVE
0088     50 0.000000 +-0.000130  SN  C  HD523  WOOD STOVE
0088     51 0.000000 +-0.000240  SB  C  HD523  WOOD STOVE
0088     56 0.000000 +-0.000650  BA  C  HD523  WOOD STOVE
0088     80 0.000000 +-0.000010  HG  C  HD523  WOOD STOVE
0088     82 0.000060 +-0.000040  PB  C  HD523  WOOD STOVE
```

Appendix G

Source Elemental Compositions - TSP

```
USER: E400

SORT

***************************************************************************
***************************************************************************


MMMMM M      MMM   MMM
M     M  M  M   M M   M
M     M  M  M   M M   M
MMMM  MMMMM M M M M M M
M        M  M   M M   M
M        M  M   M M   M
MMMMM    M   MMM   MMM


 MMM   MMM  MMMM  MMMMM
M   M M   M M   M   M
M     M   M M   M   M
 MMM  M   M MMMM    M
    M M   M M M     M
M   M M   M M  M    M
 MMM   MMM  M   M   M


***************************************************************************
***************************************************************************

LABEL:  PRT002  -FORM        -COPIES   1

SPOOLED:  08/27/82 12:31
STARTED:  08/27/82 12:31, ON: CE2P  BY: Q
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```
0004    82  .167700 +- .031500 PB   FN FRAC TRANSPORTATION
0004    35  .065400 +- .026000 BR   FN FRAC TRANSPORTATION
0004    13  .004600 +- .002390 AL   FN FRAC TRANSPORTATION
0004    14  .009880 +- .004060 SI   FN FRAC TRANSPORTATION
0004    17  .011000 +- .004200 CL   FN FRAC TRANSPORTATION
0004    20  .019160 +- .008660 CA   FN FRAC TRANSPORTATION
0004    22  .000000 +- .000070 TI   FN FRAC TRANSPORTATION
0004    26  .005480 +- .002350 FE   FN FRAC TRANSPORTATION
0004    16  .010400 +- .003800 S    FN FRAC TRANSPORTATION
0004    30  .003500 +- .001300 ZN   FN FRAC TRANSPORTATION
0004    19  .002660 +- .001180 K    FN FRAC TRANSPORTATION
0004    25  .001180 +- .000510 MN   FN FRAC TRANSPORTATION
0004    28  .000760 +- .000080 NI   FN FRAC TRANSPORTATION
0004    29  .000590 +- .000270 CU   FN FRAC TRANSPORTATION
0005    19  .002800 +- .001000 K    FN FRAC RESID OIL COMB
0005    16  .133000 +- .024000 S    FN FRAC RESID OIL COMB
0005    17  .000000 +- .001000 CL   FN FRAC RESID OIL COMB
0005    13  .005300 +- .002400 AL   FN FRAC RESID OIL COMB
0005    14  .009600 +- .004800 SI   FN FRAC RESID OIL COMB
0005    20  .015800 +- .006400 CA   FN FRAC RESID OIL COMB
0005    22  .001100 +- .000380 TI   FN FRAC RESID OIL COMB
0005    23  .034400 +- .007500 V    FN FRAC RESID OIL COMB
0005    24  .000470 +- .000150 CR   FN FRAC RESID OIL COMB
0005    25  .000460 +- .000130 MN   FN FRAC RESID OIL COMB
0005    26  .029700 +- .006100 FE   FN FRAC RESID OIL COMB
0005    28  .053600 +- .012100 NI   FN FRAC RESID OIL COMB
0005    29  .000750 +- .000250 CU   FN FRAC RESID OIL COMB
0005    30  .004000 +- .001800 ZN   FN FRAC RESID OIL COMB
0005    35  .000130 +- .000210 BR   FN FRAC RESID OIL COMB
0005    82  .001100 +- .000640 PB   FN FRAC RESID OIL COMB
0011    13 0.089230 +-0.008923    AL   T   RL103    COMPOSITE A
0011    14 0.337080 +-0.033708    SI   T   RL103    COMPOSITE A
0011    15 0.001630 +-0.000163    P    T   RL103    COMPOSITE A
0011    16 0.002040 +-0.000204    S    T   RL103    COMPOSITE A
0011    17 0.000970 +-0.000097    CL   T   RL103    COMPOSITE A
0011    19 0.018520 +-0.001852    K    T   RL103    COMPOSITE A
0011    20 0.019770 +-0.001977    CA   T   RL103    COMPOSITE A
0011    22 0.004560 +-0.000456    TI   T   RL103    COMPOSITE A
0011    23 0.000220 +-0.000022    V    T   RL103    COMPOSITE A
0011    24 0.000220 +-0.000022    CR   T   RL103    COMPOSITE A
0011    25 0.000750 +-0.000075    MN   T   RL103    COMPOSITE A
0011    26 0.038630 +-0.003863    FE   T   RL103    COMPOSITE A
0011    28 0.000060 +-0.000010    NI   T   RL103    COMPOSITE A
0011    29 0.000380 +-0.000038    CU   T   RL103    COMPOSITE A
0011    30 0.000480 +-0.000048    ZN   T   RL103    COMPOSITE A
0011    33 0.000060 +-0.000020    AS   T   RL103    COMPOSITE A
0011    34 0.000010 +-0.000001    SE   T   RL103    COMPOSITE A
0011    35 0.000020 +-0.000002    BR   T   RL103    COMPOSITE A
0011    38 0.000160 +-0.000016    SR   T   RL103    COMPOSITE A
0011    46 0.000000 +-0.000020    PD   T   RL103    COMPOSITE A
0011    47 0.000000 +-0.000030    AG   T   RL103    COMPOSITE A
0011    48 0.000080 +-0.000040    CD   T   RL103    COMPOSITE A
0011    49 0.000000 +-0.000040    IN   T   RL103    COMPOSITE A
0011    50 0.000000 +-0.000050    SN   T   RL103    COMPOSITE A
0011    51 0.000040 +-0.000080    SB   T   RL103    COMPOSITE A
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0011     56 0.000180 +-0.000250   BA   T   RL103    COMPOSITE A
0011     80 0.000010 +-0.000010   HG   T   RL103    COMPOSITE A
0011     82 0.000550 +-0.000055   PB   T   RL103    COMPOSITE A
0012     13 0.056520 +-0.005652   AL   T   RL105    COMPOSITE B
0012     14 0.235360 +-0.023536   SI   T   RL105    COMPOSITE B
0012     15 0.000980 +-0.000100   P    T   RL105    COMPOSITE B
0012     16 0.003770 +-0.000377   S    T   RL105    COMPOSITE B
0012     17 0.001940 +-0.000194   CL   T   RL105    COMPOSITE B
0012     19 0.019560 +-0.001956   K    T   RL105    COMPOSITE B
0012     20 0.091960 +-0.009196   CA   T   RL105    COMPOSITE B
0012     22 0.002900 +-0.000290   TI   T   RL105    COMPOSITE B
0012     23 0.000150 +-0.000015   V    T   RL105    COMPOSITE B
0012     24 0.000140 +-0.000014   CR   T   RL105    COMPOSITE B
0012     25 0.000550 +-0.000055   MN   T   RL105    COMPOSITE B
0012     26 0.023660 +-0.002366   FE   T   RL105    COMPOSITE B
0012     28 0.000040 +-0.000004   NI   T   RL105    COMPOSITE B
0012     29 0.000290 +-0.000029   CU   T   RL105    COMPOSITE B
0012     30 0.000830 +-0.000083   ZN   T   RL105    COMPOSITE B
0012     33 0.000110 +-0.000020   AS   T   RL105    COMPOSITE B
0012     34 0.000010 +-0.000001   SE   T   RL105    COMPOSITE B
0012     35 0.000030 +-0.000003   BR   T   RL105    COMPOSITE B
0012     38 0.000130 +-0.000013   SR   T   RL105    COMPOSITE B
0012     46 0.000000 +-0.000020   PD   T   RL105    COMPOSITE B
0012     47 0.000010 +-0.000020   AG   T   RL105    COMPOSITE B
0012     48 0.000100 +-0.000030   CD   T   RL105    COMPOSITE B
0012     49 0.000000 +-0.000040   IN   T   RL105    COMPOSITE B
0012     50 0.000050 +-0.000040   SN   T   RL105    COMPOSITE B
0012     51 0.000210 +-0.000070   SB   T   RL105    COMPOSITE B
0012     56 0.000060 +-0.000200   BA   T   RL105    COMPOSITE B
0012     80 0.000020 +-0.000010   HG   T   RL105    COMPOSITE B
0012     82 0.001360 +-0.000136   PB   T   RL105    COMPOSITE B
0013     13 0.094200 +-0.009420   AL   T   RL106    COMPOSITE C
0013     14 0.343620 +-0.034362   SI   T   RL106    COMPOSITE C
0013     15 0.001930 +-0.000193   P    T   RL106    COMPOSITE C
0013     16 0.003170 +-0.000317   S    T   RL106    COMPOSITE C
0013     17 0.001360 +-0.000136   CL   T   RL106    COMPOSITE C
0013     19 0.017280 +-0.001728   K    T   RL106    COMPOSITE C
0013     20 0.056190 +-0.005619   CA   T   RL106    COMPOSITE C
0013     22 0.004050 +-0.000405   TI   T   RL106    COMPOSITE C
0013     23 0.000230 +-0.000023   V    T   RL106    COMPOSITE C
0013     24 0.000180 +-0.000018   CR   T   RL106    COMPOSITE C
0013     25 0.000950 +-0.000095   MN   T   RL106    COMPOSITE C
0013     26 0.036160 +-0.003616   FE   T   RL106    COMPOSITE C
0013     28 0.000040 +-0.000010   NI   T   RL106    COMPOSITE C
0013     29 0.000170 +-0.000017   CU   T   RL106    COMPOSITE C
0013     30 0.000680 +-0.000068   ZN   T   RL106    COMPOSITE C
0013     33 0.000170 +-0.000040   AS   T   RL106    COMPOSITE C
0013     34 0.000020 +-0.000010   SE   T   RL106    COMPOSITE C
0013     35 0.000090 +-0.000010   BR   T   RL106    COMPOSITE C
0013     38 0.000220 +-0.000022   SR   T   RL106    COMPOSITE C
0013     46 0.000000 +-0.000030   PD   T   RL106    COMPOSITE C
0013     47 0.000000 +-0.000040   AG   T   RL106    COMPOSITE C
0013     48 0.000130 +-0.000060   CD   T   RL106    COMPOSITE C
0013     49 0.000000 +-0.000070   IN   T   RL106    COMPOSITE C
0013     50 0.000000 +-0.000070   SN   T   RL106    COMPOSITE C
0013     51 0.000200 +-0.000130   SB   T   RL106    COMPOSITE C
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```
0013    56 0.000000 +-0.000380   BA   T   RL106    COMPOSITE C
0013    80 0.000040 +-0.000010   HG   T   RL106    COMPOSITE C
0013    82 0.002030 +-0.000203   PB   T   RL106    COMPOSITE C
0014    13 0.094070 +-0.009407   AL   T   RL059   COMPOSITE D
0014    14 0.369060 +-0.036906   SI   T   RL059   COMPOSITE D
0014    15 0.002230 +-0.000223   P    T   RL059   COMPOSITE D
0014    16 0.003630 +-0.000400   S    T   RL059   COMPOSITE D
0014    17 0.000890 +-0.000090   CL   T   RL059   COMPOSITE D
0014    19 0.018220 +-0.001822   K    T   RL059   COMPOSITE D
0014    20 0.008630 +-0.000863   CA   T   RL059   COMPOSITE D
0014    22 0.005290 +-0.000529   TI   T   RL059   COMPOSITE D
0014    23 0.000250 +-0.000025   V    T   RL059   COMPOSITE D
0014    24 0.000210 +-0.000021   CR   T   RL059   COMPOSITE D
0014    25 0.000870 +-0.000087   MN   T   RL059   COMPOSITE D
0014    26 0.046070 +-0.004607   FE   T   RL059   COMPOSITE D
0014    28 0.000070 +-0.000010   NI   T   RL059   COMPOSITE D
0014    29 0.002170 +-0.000217   CU   T   RL059   COMPOSITE D
0014    30 0.002080 +-0.000208   ZN   T   RL059   COMPOSITE D
0014    33 0.000630 +-0.000070   AS   T   RL059   COMPOSITE D
0014    34 0.000020 +-0.000010   SE   T   RL059   COMPOSITE D
0014    35 0.000190 +-0.000019   BR   T   RL059   COMPOSITE D
0014    38 0.000190 +-0.000019   SR   T   RL059   COMPOSITE D
0014    46 0.000020 +-0.000020   PD   T   RL059   COMPOSITE D
0014    47 0.000020 +-0.000040   AG   T   RL059   COMPOSITE D
0014    48 0.000030 +-0.000060   CD   T   RL059   COMPOSITE D
0014    49 0.000170 +-0.000060   IN   T   RL059   COMPOSITE D
0014    50 0.000160 +-0.000070   SN   T   RL059   COMPOSITE D
0014    51 0.000000 +-0.000140   SB   T   RL059   COMPOSITE D
0014    56 0.000000 +-0.000350   BA   T   RL059   COMPOSITE D
0014    80 0.000040 +-0.000010   HG   T   RL059   COMPOSITE D
0014    82 0.007980 +-0.000798   PB   T   RL059   COMPOSITE D
0015    13 0.099250 +-0.009925   AL   T   RL047   COMPOSITE E
0015    14 0.374680 +-0.037468   SI   T   RL047   COMPOSITE E
0015    15 0.002600 +-0.000260   P    T   RL047   COMPOSITE E
0015    16 0.006030 +-0.000660   S    T   RL047   COMPOSITE E
0015    17 0.000850 +-0.000160   CL   T   RL047   COMPOSITE E
0015    19 0.020310 +-0.002031   K    T   RL047   COMPOSITE E
0015    20 0.031190 +-0.003119   CA   T   RL047   COMPOSITE E
0015    22 0.005050 +-0.000505   TI   T   RL047   COMPOSITE E
0015    23 0.000270 +-0.000040   V    T   RL047   COMPOSITE E
0015    24 0.000250 +-0.000030   CR   T   RL047   COMPOSITE E
0015    25 0.001110 +-0.000111   MN   T   RL047   COMPOSITE E
0015    26 0.045550 +-0.004555   FE   T   RL047   COMPOSITE E
0015    28 0.000150 +-0.000030   NI   T   RL047   COMPOSITE E
0015    29 0.012040 +-0.001204   CU   T   RL047   COMPOSITE E
0015    30 0.007260 +-0.000726   ZN   T   RL047   COMPOSITE E
0015    33 0.000680 +-0.000140   AS   T   RL047   COMPOSITE E
0015    34 0.000010 +-0.000010   SE   T   RL047   COMPOSITE E
0015    35 0.000170 +-0.000020   BR   T   RL047   COMPOSITE E
0015    38 0.000290 +-0.000030   SR   T   RL047   COMPOSITE E
0015    46 0.000000 +-0.000070   PD   T   RL047   COMPOSITE E
0015    47 0.000010 +-0.000110   AG   T   RL047   COMPOSITE E
0015    48 0.000540 +-0.000160   CD   T   RL047   COMPOSITE E
0015    49 0.000270 +-0.000180   IN   T   RL047   COMPOSITE E
0015    50 0.000310 +-0.000200   SN   T   RL047   COMPOSITE E
0015    51 0.000210 +-0.000400   SB   T   RL047   COMPOSITE E
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```
0015      56 0.001860 +-0.001000   BA   T   RL047   COMPOSITE E
0015      80 0.000020 +-0.000030   HG   T   RL047   COMPOSITE E
0015      82 0.010700 +-0.001070   PB   T   RL047   COMPOSITE E
0016      13 0.069900 +-0.006990   AL   T   RL060   COMPOSITE F
0016      14 0.241450 +-0.024145   SI   T   RL060   COMPOSITE F
0016      15 0.001680 +-0.000168   P    T   RL060   COMPOSITE F
0016      16 0.004000 +-0.000400   S    T   RL060   COMPOSITE F
0016      17 0.001410 +-0.000141   CL   T   RL060   COMPOSITE F
0016      19 0.013470 +-0.001347   K    T   RL060   COMPOSITE F
0016      20 0.017280 +-0.001728   CA   T   RL060   COMPOSITE F
0016      22 0.003710 +-0.000371   TI   T   RL060   COMPOSITE F
0016      23 0.000210 +-0.000021   Y    T   RL060   COMPOSITE F
0016      24 0.000180 +-0.000020   CR   T   RL060   COMPOSITE F
0016      25 0.001530 +-0.000153   MN   T   RL060   COMPOSITE F
0016      26 0.035140 +-0.003514   FE   T   RL060   COMPOSITE F
0016      28 0.000050 +-0.000010   NI   T   RL060   COMPOSITE F
0016      29 0.001460 +-0.000146   CU   T   RL060   COMPOSITE F
0016      30 0.001850 +-0.000185   ZN   T   RL060   COMPOSITE F
0016      33 0.000200 +-0.000050   AS   T   RL060   COMPOSITE F
0016      34 0.000020 +-0.000010   SE   T   RL060   COMPOSITE F
0016      35 0.000090 +-0.000010   BR   T   RL060   COMPOSITE F
0016      38 0.000200 +-0.000020   SR   T   RL060   COMPOSITE F
0016      46 0.000040 +-0.000030   PD   T   RL060   COMPOSITE F
0016      47 0.000000 +-0.000060   AG   T   RL060   COMPOSITE F
0016      48 0.000010 +-0.000090   CD   T   RL060   COMPOSITE F
0016      49 0.000060 +-0.000080   IN   T   RL060   COMPOSITE F
0016      50 0.000130 +-0.000100   SN   T   RL060   COMPOSITE F
0016      51 0.000090 +-0.000200   SB   T   RL060   COMPOSITE F
0016      56 0.000000 +-0.000510   BA   T   RL060   COMPOSITE F
0016      80 0.000020 +-0.000010   HG   T   RL060   COMPOSITE F
0016      82 0.002290 +-0.000229   PB   T   RL060   COMPOSITE F
0017      13 0.066560 +-0.006656   AL   T   RL048   COMPOSITE G
0017      14 0.204470 +-0.020447   SI   T   RL048   COMPOSITE G
0017      15 0.002090 +-0.000209   P    T   RL048   COMPOSITE G
0017      16 0.011430 +-0.001143   S    T   RL048   COMPOSITE G
0017      17 0.001350 +-0.000135   CL   T   RL048   COMPOSITE G
0017      19 0.012060 +-0.001206   K    T   RL048   COMPOSITE G
0017      20 0.043050 +-0.004305   CA   T   RL048   COMPOSITE G
0017      22 0.003320 +-0.000332   TI   T   RL048   COMPOSITE G
0017      23 0.000270 +-0.000027   Y    T   RL048   COMPOSITE G
0017      24 0.000310 +-0.000031   CR   T   RL048   COMPOSITE G
0017      25 0.000980 +-0.000098   MN   T   RL048   COMPOSITE G
0017      26 0.078900 +-0.007890   FE   T   RL048   COMPOSITE G
0017      28 0.000250 +-0.000025   NI   T   RL048   COMPOSITE G
0017      29 0.036430 +-0.003643   CU   T   RL048   COMPOSITE G
0017      30 0.012070 +-0.001207   ZN   T   RL048   COMPOSITE G
0017      33 0.000660 +-0.000090   AS   T   RL048   COMPOSITE G
0017      34 0.000020 +-0.000010   SE   T   RL048   COMPOSITE G
0017      35 0.000260 +-0.000026   BR   T   RL048   COMPOSITE G
0017      38 0.000310 +-0.000031   SR   T   RL048   COMPOSITE G
0017      46 0.000000 +-0.000040   PD   T   RL048   COMPOSITE G
0017      47 0.000020 +-0.000060   AG   T   RL048   COMPOSITE G
0017      48 0.000470 +-0.000100   CD   T   RL048   COMPOSITE G
0017      49 0.000050 +-0.000090   IN   T   RL048   COMPOSITE G
0017      50 0.000150 +-0.000110   SN   T   RL048   COMPOSITE G
0017      51 0.000000 +-0.000210   SB   T   RL048   COMPOSITE G
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0017     56 0.000000 +-0.000520   BA   T   RL048   COMPOSITE G
0017     80 0.000040 +-0.000020   HG   T   RL048   COMPOSITE G
0017     82 0.008980 +-0.000898   PB   T   RL048   COMPOSITE G
0018     13 0.064310 +-0.006431   AL   T   RL049   COMPOSITE H
0018     14 0.245650 +-0.024565   SI   T   RL049   COMPOSITE H
0018     15 0.002150 +-0.000215   P    T   RL049   COMPOSITE H
0018     16 0.008730 +-0.000873   S    T   RL049   COMPOSITE H
0018     17 0.003050 +-0.000305   CL   T   RL049   COMPOSITE H
0018     19 0.016700 +-0.001670   K    T   RL049   COMPOSITE H
0018     20 0.027140 +-0.002714   CA   T   RL049   COMPOSITE H
0018     22 0.004010 +-0.000401   TI   T   RL049   COMPOSITE H
0018     23 0.000230 +-0.000030   V    T   RL049   COMPOSITE H
0018     24 0.000220 +-0.000022   CR   T   RL049   COMPOSITE H
0018     25 0.000740 +-0.000074   MN   T   RL049   COMPOSITE H
0018     26 0.032560 +-0.003256   FE   T   RL049   COMPOSITE H
0018     28 0.000070 +-0.000020   NI   T   RL049   COMPOSITE H
0018     29 0.002420 +-0.000242   CU   T   RL049   COMPOSITE H
0018     30 0.002180 +-0.000218   ZN   T   RL049   COMPOSITE H
0018     33 0.000230 +-0.000080   AS   T   RL049   COMPOSITE H
0018     34 0.000010 +-0.000010   SE   T   RL049   COMPOSITE H
0018     35 0.000990 +-0.000099   BR   T   RL049   COMPOSITE H
0018     38 0.000250 +-0.000030   SR   T   RL049   COMPOSITE H
0018     46 0.000000 +-0.000060   PD   T   RL049   COMPOSITE H
0018     47 0.000000 +-0.000090   AG   T   RL049   COMPOSITE H
0018     48 0.000410 +-0.000140   CD   T   RL049   COMPOSITE H
0018     49 0.000010 +-0.000150   IN   T   RL049   COMPOSITE H
0018     50 0.000000 +-0.000160   SN   T   RL049   COMPOSITE H
0018     51 0.000000 +-0.000320   SB   T   RL049   COMPOSITE H
0018     56 0.000130 +-0.000840   BA   T   RL049   COMPOSITE H
0018     80 0.000030 +-0.000030   HG   T   RL049   COMPOSITE H
0018     82 0.004100 +-0.000410   PB   T   RL049   COMPOSITE H
0019     13 0.099370 +-0.009937   AL   T   RL104    COMPOSITE I
0019     14 0.326790 +-0.032679   SI   T   RL104    COMPOSITE I
0019     15 0.001540 +-0.000154   P    T   RL104    COMPOSITE I
0019     16 0.002360 +-0.000236   S    T   RL104    COMPOSITE I
0019     17 0.001250 +-0.000125   CL   T   RL104    COMPOSITE I
0019     19 0.022420 +-0.002242   K    T   RL104    COMPOSITE I
0019     20 0.038540 +-0.003854   CA   T   RL104    COMPOSITE I
0019     22 0.004730 +-0.000473   TI   T   RL104    COMPOSITE I
0019     23 0.000230 +-0.000050   V    T   RL104    COMPOSITE I
0019     24 0.000210 +-0.000021   CR   T   RL104    COMPOSITE I
0019     25 0.000370 +-0.000037   MN   T   RL104    COMPOSITE I
0019     26 0.022130 +-0.002213   FE   T   RL104    COMPOSITE I
0019     28 0.000050 +-0.000010   HI   T   RL104    COMPOSITE I
0019     29 0.000240 +-0.000024   CU   T   RL104    COMPOSITE I
0019     30 0.000290 +-0.000029   ZN   T   RL104    COMPOSITE I
0019     33 0.000000 +-0.000020   AS   T   RL104    COMPOSITE I
0019     34 0.000020 +-0.000010   SE   T   RL104    COMPOSITE I
0019     35 0.000020 +-0.000010   BR   T   RL104    COMPOSITE I
0019     38 0.000370 +-0.000037   SR   T   RL104    COMPOSITE I
0019     46 0.000000 +-0.000040   PD   T   RL104    COMPOSITE I
0019     47 0.000000 +-0.000050   AG   T   RL104    COMPOSITE I
0019     48 0.000000 +-0.000060   CD   T   RL104    COMPOSITE I
0019     49 0.000000 +-0.000080   IN   T   RL104    COMPOSITE I
0019     50 0.000000 +-0.000090   SN   T   RL104    COMPOSITE I
0019     51 0.000110 +-0.000150   SB   T   RL104    COMPOSITE I
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0019    56 0.002700  +-0.000510   BA   T   RL104    COMPOSITE I
0019    80 0.000000  +-0.000010   HG   T   RL104    COMPOSITE I
0019    82 0.000350  +-0.000040   PB   T   RL104    COMPOSITE I
0020    13 0.055860  +-0.005586   AL   T   RL061   COMPOSITE J
0020    14 0.199430  +-0.019943   SI   T   RL061   COMPOSITE J
0020    15 0.001310  +-0.000131   P    T   RL061   COMPOSITE J
0020    16 0.008560  +-0.000856   S    T   RL061   COMPOSITE J
0020    17 0.000630  +-0.000120   CL   T   RL061   COMPOSITE J
0020    19 0.012160  +-0.001216   K    T   RL061   COMPOSITE J
0020    20 0.055830  +-0.005583   CA   T   RL061   COMPOSITE J
0020    22 0.003090  +-0.000309   TI   T   RL061   COMPOSITE J
0020    23 0.000180  +-0.000020   V    T   RL061   COMPOSITE J
0020    24 0.000180  +-0.000020   CR   T   RL061   COMPOSITE J
0020    25 0.001060  +-0.000106   MN   T   RL061   COMPOSITE J
0020    26 0.031090  +-0.003109   FE   T   RL061   COMPOSITE J
0020    28 0.000110  +-0.000011   NI   T   RL061   COMPOSITE J
0020    29 0.005030  +-0.000503   CU   T   RL061   COMPOSITE J
0020    30 0.005900  +-0.000590   ZN   T   RL061   COMPOSITE J
0020    33 0.001530  +-0.000153   AS   T   RL061   COMPOSITE J
0020    34 0.000050  +-0.000010   SE   T   RL061   COMPOSITE J
0020    35 0.000230  +-0.000023   BR   T   RL061   COMPOSITE J
0020    38 0.000260  +-0.000026   SR   T   RL061   COMPOSITE J
0020    46 0.000080  +-0.000040   PD   T   RL061   COMPOSITE J
0020    47 0.000100  +-0.000060   AG   T   RL061   COMPOSITE J
0020    48 0.000400  +-0.000100   CD   T   RL061   COMPOSITE J
0020    49 0.000230  +-0.000090   IN   T   RL061   COMPOSITE J
0020    50 0.000280  +-0.000110   SN   T   RL061   COMPOSITE J
0020    51 0.000550  +-0.000220   SB   T   RL061   COMPOSITE J
0020    56 0.000000  +-0.000520   BA   T   RL061   COMPOSITE J
0020    80 0.000020  +-0.000020   HG   T   RL061   COMPOSITE J
0020    82 0.015070  +-0.001507   PB   T   RL061   COMPOSITE J
0021    13 0.054520  +-0.005452   AL   T   RL062   COMPOSITE K
0021    14 0.196270  +-0.019627   SI   T   RL062   COMPOSITE K
0021    15 0.001600  +-0.000160   P    T   RL062   COMPOSITE K
0021    16 0.012650  +-0.001410   S    T   RL062   COMPOSITE K
0021    17 0.000000  +-0.000130   CL   T   RL062   COMPOSITE K
0021    19 0.011580  +-0.001158   K    T   RL062   COMPOSITE K
0021    20 0.042550  +-0.004255   CA   T   RL062   COMPOSITE K
0021    22 0.002990  +-0.000299   TI   T   RL062   COMPOSITE K
0021    23 0.000210  +-0.000021   V    T   RL062   COMPOSITE K
0021    24 0.000270  +-0.000027   CR   T   RL062   COMPOSITE K
0021    25 0.001280  +-0.000128   MN   T   RL062   COMPOSITE K
0021    26 0.039310  +-0.003931   FE   T   RL062   COMPOSITE K
0021    28 0.000480  +-0.000048   NI   T   RL062   COMPOSITE K
0021    29 0.082320  +-0.008232   CU   T   RL062   COMPOSITE K
0021    30 0.015530  +-0.001553   ZN   T   RL062   COMPOSITE K
0021    33 0.002900  +-0.000290   AS   T   RL062   COMPOSITE K
0021    34 0.000060  +-0.000010   SE   T   RL062   COMPOSITE K
0021    35 0.000380  +-0.000038   BR   T   RL062   COMPOSITE K
0021    38 0.000390  +-0.000039   SR   T   RL062   COMPOSITE K
0021    46 0.000070  +-0.000030   PD   T   RL062   COMPOSITE K
0021    47 0.000250  +-0.000050   AG   T   RL062   COMPOSITE K
0021    48 0.001200  +-0.000120   CD   T   RL062   COMPOSITE K
0021    49 0.000050  +-0.000070   IN   T   RL062   COMPOSITE K
0021    50 0.000510  +-0.000100   SN   T   RL062   COMPOSITE K
0021    51 0.001680  +-0.000230   SB   T   RL062   COMPOSITE K
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0021     56 0.001010 +-0.000410   BA  T  RL062  COMPOSITE K
0021     80 0.000080 +-0.000020   HG  T  RL062  COMPOSITE K
0021     82 0.028800 +-0.002880   PB  T  RL062  COMPOSITE K
0022     13 0.081140 +-0.008114   AL  T  RL063  COMPOSITE L
0022     14 0.289410 +-0.028941   SI  T  RL063  COMPOSITE L
0022     15 0.002020 +-0.000202   P   T  RL063  COMPOSITE L
0022     16 0.008890 +-0.000889   S   T  RL063  COMPOSITE L
0022     17 0.000460 +-0.000100   CL  T  RL063  COMPOSITE L
0022     19 0.016620 +-0.001662   K   T  RL063  COMPOSITE L
0022     20 0.028650 +-0.002865   CA  T  RL063  COMPOSITE L
0022     22 0.003940 +-0.000394   TI  T  RL063  COMPOSITE L
0022     23 0.000260 +-0.000026   V   T  RL063  COMPOSITE L
0022     24 0.000240 +-0.000024   CR  T  RL063  COMPOSITE L
0022     25 0.001230 +-0.000123   MN  T  RL063  COMPOSITE L
0022     26 0.046270 +-0.004627   FE  T  RL063  COMPOSITE L
0022     28 0.000230 +-0.000023   NI  T  RL063  COMPOSITE L
0022     29 0.027780 +-0.002778   CU  T  RL063  COMPOSITE L
0022     30 0.010340 +-0.001034   ZN  T  RL063  COMPOSITE L
0022     33 0.001410 +-0.000141   AS  T  RL063  COMPOSITE L
0022     34 0.000040 +-0.000010   SE  T  RL063  COMPOSITE L
0022     35 0.000230 +-0.000023   BR  T  RL063  COMPOSITE L
0022     38 0.000400 +-0.000040   SR  T  RL063  COMPOSITE L
0022     46 0.000040 +-0.000040   PD  T  RL063  COMPOSITE L
0022     47 0.000210 +-0.000060   AG  T  RL063  COMPOSITE L
0022     48 0.000560 +-0.000090   CD  T  RL063  COMPOSITE L
0022     49 0.000000 +-0.000080   IN  T  RL063  COMPOSITE L
0022     50 0.000310 +-0.000100   SN  T  RL063  COMPOSITE L
0022     51 0.000770 +-0.000210   SB  T  RL063  COMPOSITE L
0022     56 0.000490 +-0.000430   BA  T  RL063  COMPOSITE L
0022     80 0.000080 +-0.000020   HG  T  RL063  COMPOSITE L
0022     82 0.016270 +-0.001627   PB  T  RL063  COMPOSITE L
0023     13 0.023890 +-0.002389   AL  T  RL051  COMPOSITE M
0023     14 0.073950 +-0.007395   SI  T  RL051  COMPOSITE M
0023     15 0.000320 +-0.000250   P   T  RL051  COMPOSITE M
0023     16 0.009490 +-0.000949   S   T  RL051  COMPOSITE M
0023     17 0.003450 +-0.000345   CL  T  RL051  COMPOSITE M
0023     19 0.008650 +-0.000865   K   T  RL051  COMPOSITE M
0023     20 0.263330 +-0.026333   CA  T  RL051  COMPOSITE M
0023     22 0.001030 +-0.000103   TI  T  RL051  COMPOSITE M
0023     23 0.000080 +-0.000010   V   T  RL051  COMPOSITE M
0023     24 0.000080 +-0.000010   CR  T  RL051  COMPOSITE M
0023     25 0.000470 +-0.000047   MN  T  RL051  COMPOSITE M
0023     26 0.011850 +-0.001185   FE  T  RL051  COMPOSITE M
0023     28 0.000060 +-0.000010   NI  T  RL051  COMPOSITE M
0023     29 0.001650 +-0.000165   CU  T  RL051  COMPOSITE M
0023     30 0.002360 +-0.000236   ZN  T  RL051  COMPOSITE M
0023     33 0.000720 +-0.000072   AS  T  RL051  COMPOSITE M
0023     34 0.000030 +-0.000003   SE  T  RL051  COMPOSITE M
0023     35 0.000090 +-0.000010   BR  T  RL051  COMPOSITE M
0023     38 0.000230 +-0.000023   SR  T  RL051  COMPOSITE M
0023     46 0.000010 +-0.000020   PD  T  RL051  COMPOSITE M
0023     47 0.000100 +-0.000030   AG  T  RL051  COMPOSITE M
0023     48 0.000260 +-0.000040   CD  T  RL051  COMPOSITE M
0023     49 0.000050 +-0.000040   IN  T  RL051  COMPOSITE M
0023     50 0.000080 +-0.000040   SN  T  RL051  COMPOSITE M
0023     51 0.000320 +-0.000090   SB  T  RL051  COMPOSITE M
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0023      56 0.000170 +-0.000210   BA   T  RL051   COMPOSITE M
0023      80 0.000040 +-0.000010   HG   T  RL051   COMPOSITE M
0023      82 0.007370 +-0.000737   PB   T  RL051   COMPOSITE M
0024      13 0.085250 +-0.008525   AL   T  RL052   COMPOSITE N
0024      14 0.314890 +-0.031489   SI   T  RL052   COMPOSITE N
0024      15 0.001980 +-0.000198   P    T  RL052   COMPOSITE N
0024      16 0.008320 +-0.000832   S    T  RL052   COMPOSITE N
0024      17 0.001070 +-0.000130   CL   T  RL052   COMPOSITE N
0024      19 0.017260 +-0.001726   K    T  RL052   COMPOSITE N
0024      20 0.046310 +-0.004631   CA   T  RL052   COMPOSITE N
0024      22 0.004330 +-0.000433   TI   T  RL052   COMPOSITE N
0024      23 0.000280 +-0.000030   V    T  RL052   COMPOSITE N
0024      24 0.000230 +-0.000023   CR   T  RL052   COMPOSITE N
0024      25 0.000980 +-0.000098   MN   T  RL052   COMPOSITE N
0024      26 0.042940 +-0.004294   FE   T  RL052   COMPOSITE N
0024      28 0.000120 +-0.000020   NI   T  RL052   COMPOSITE N
0024      29 0.002820 +-0.000282   CU   T  RL052   COMPOSITE N
0024      30 0.003890 +-0.000389   ZN   T  RL052   COMPOSITE N
0024      33 0.000760 +-0.000100   AS   T  RL052   COMPOSITE N
0024      34 0.000020 +-0.000010   SE   T  RL052   COMPOSITE N
0024      35 0.000170 +-0.000020   BR   T  RL052   COMPOSITE N
0024      38 0.000330 +-0.000033   SR   T  RL052   COMPOSITE N
0024      46 0.000090 +-0.000040   PD   T  RL052   COMPOSITE N
0024      47 0.000030 +-0.000070   AG   T  RL052   COMPOSITE N
0024      48 0.000210 +-0.000110   CD   T  RL052   COMPOSITE N
0024      49 0.000210 +-0.000100   IN   T  RL052   COMPOSITE N
0024      50 0.000300 +-0.000130   SN   T  RL052   COMPOSITE N
0024      51 0.000150 +-0.000250   SB   T  RL052   COMPOSITE N
0024      56 0.000000 +-0.000620   BA   T  RL052   COMPOSITE N
0024      80 0.000040 +-0.000020   HG   T  RL052   COMPOSITE N
0024      82 0.008690 +-0.000869   PB   T  RL052   COMPOSITE N
0025      13 0.051900 +-0.005190   AL   T  RL053   COMPOSITE O
0025      14 0.187370 +-0.018737   SI   T  RL053   COMPOSITE O
0025      15 0.001820 +-0.000182   P    T  RL053   COMPOSITE O
0025      16 0.021170 +-0.002430   S    T  RL053   COMPOSITE O
0025      17 0.000000 +-0.000170   CL   T  RL053   COMPOSITE O
0025      19 0.014130 +-0.001413   K    T  RL053   COMPOSITE O
0025      20 0.061500 +-0.006150   CA   T  RL053   COMPOSITE O
0025      22 0.002740 +-0.000274   TI   T  RL053   COMPOSITE O
0025      23 0.000260 +-0.000026   V    T  RL053   COMPOSITE O
0025      24 0.000260 +-0.000026   CR   T  RL053   COMPOSITE O
0025      25 0.002000 +-0.000200   MN   T  RL053   COMPOSITE O
0025      26 0.045910 +-0.004591   FE   T  RL053   COMPOSITE O
0025      28 0.000400 +-0.000040   NI   T  RL053   COMPOSITE O
0025      29 0.031800 +-0.003180   CU   T  RL053   COMPOSITE O
0025      30 0.023130 +-0.002313   ZN   T  RL053   COMPOSITE O
0025      33 0.006190 +-0.000619   AS   T  RL053   COMPOSITE O
0025      34 0.000190 +-0.000020   SE   T  RL053   COMPOSITE O
0025      35 0.000710 +-0.000071   BR   T  RL053   COMPOSITE O
0025      38 0.000630 +-0.000063   SR   T  RL053   COMPOSITE O
0025      46 0.000230 +-0.000030   PD   T  RL053   COMPOSITE O
0025      47 0.000670 +-0.000067   AG   T  RL053   COMPOSITE O
0025      48 0.002430 +-0.000243   CD   T  RL053   COMPOSITE O
0025      49 0.000160 +-0.000040   IN   T  RL053   COMPOSITE O
0025      50 0.000760 +-0.000076   SN   T  RL053   COMPOSITE O
0025      51 0.003910 +-0.000391   SB   T  RL053   COMPOSITE O
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0025    56 0.000740 +-0.000210   BA   T   RL053   COMPOSITE O
0025    80 0.000210 +-0.000030   HG   T   RL053   COMPOSITE O
0025    82 0.053990 +-0.005399   PB   T   RL053   COMPOSITE O
0026    13 0.074640 +-0.007464   AL   T   RL054   COMPOSITE P
0026    14 0.257910 +-0.025791   SI   T   RL054   COMPOSITE P
0026    15 0.001680 +-0.000168   P    T   RL054   COMPOSITE P
0026    16 0.007460 +-0.000746   S    T   RL054   COMPOSITE P
0026    17 0.000560 +-0.000080   CL   T   RL054   COMPOSITE P
0026    19 0.016890 +-0.001689   K    T   RL054   COMPOSITE P
0026    20 0.023160 +-0.002316   CA   T   RL054   COMPOSITE P
0026    22 0.004330 +-0.000433   TI   T   RL054   COMPOSITE P
0026    23 0.000300 +-0.000030   V    T   RL054   COMPOSITE P
0026    24 0.000260 +-0.000026   CR   T   RL054   COMPOSITE P
0026    25 0.001280 +-0.000128   MN   T   RL054   COMPOSITE P
0026    26 0.046750 +-0.004675   FE   T   RL054   COMPOSITE P
0026    28 0.000150 +-0.000015   NI   T   RL054   COMPOSITE P
0026    29 0.009660 +-0.000966   CU   T   RL054   COMPOSITE P
0026    30 0.007940 +-0.000794   ZN   T   RL054   COMPOSITE P
0026    33 0.001210 +-0.000121   AS   T   RL054   COMPOSITE P
0026    34 0.000030 +-0.000010   SE   T   RL054   COMPOSITE P
0026    35 0.000240 +-0.000024   BR   T   RL054   COMPOSITE P
0026    38 0.000340 +-0.000034   SR   T   RL054   COMPOSITE P
0026    46 0.000080 +-0.000020   PD   T   RL054   COMPOSITE P
0026    47 0.000130 +-0.000030   AG   T   RL054   COMPOSITE P
0026    48 0.000320 +-0.000060   CD   T   RL054   COMPOSITE P
0026    49 0.000090 +-0.000040   IN   T   RL054   COMPOSITE P
0026    50 0.000180 +-0.000050   SN   T   RL054   COMPOSITE P
0026    51 0.000620 +-0.000120   SB   T   RL054   COMPOSITE P
0026    56 0.000000 +-0.000270   BA   T   RL054   COMPOSITE P
0026    80 0.000060 +-0.000010   HG   T   RL054   COMPOSITE P
0026    82 0.013560 +-0.001356   PB   T   RL054   COMPOSITE P
0027    13 0.063310 +-0.006331   AL   T   RL055   COMPOSITE Q
0027    14 0.231810 +-0.023181   SI   T   RL055   COMPOSITE Q
0027    15 0.001650 +-0.000165   P    T   RL055   COMPOSITE Q
0027    16 0.009550 +-0.001020   S    T   RL055   COMPOSITE Q
0027    17 0.000460 +-0.000090   CL   T   RL055   COMPOSITE Q
0027    19 0.015470 +-0.001547   K    T   RL055   COMPOSITE Q
0027    20 0.053970 +-0.005397   CA   T   RL055   COMPOSITE Q
0027    22 0.003980 +-0.000398   TI   T   RL055   COMPOSITE Q
0027    23 0.000260 +-0.000026   V    T   RL055   COMPOSITE Q
0027    24 0.000300 +-0.000030   CR   T   RL055   COMPOSITE Q
0027    25 0.001470 +-0.000147   MN   T   RL055   COMPOSITE Q
0027    26 0.051750 +-0.005175   FE   T   RL055   COMPOSITE Q
0027    28 0.000210 +-0.000021   NI   T   RL055   COMPOSITE Q
0027    29 0.012890 +-0.001289   CU   T   RL055   COMPOSITE Q
0027    30 0.013120 +-0.001312   ZN   T   RL055   COMPOSITE Q
0027    33 0.002090 +-0.000209   AS   T   RL055   COMPOSITE Q
0027    34 0.000050 +-0.000010   SE   T   RL055   COMPOSITE Q
0027    35 0.000290 +-0.000029   BR   T   RL055   COMPOSITE Q
0027    38 0.000430 +-0.000043   SR   T   RL055   COMPOSITE Q
0027    46 0.000080 +-0.000020   PD   T   RL055   COMPOSITE Q
0027    47 0.000220 +-0.000030   AG   T   RL055   COMPOSITE Q
0027    48 0.000780 +-0.000078   CD   T   RL055   COMPOSITE Q
0027    49 0.000160 +-0.000040   IN   T   RL055   COMPOSITE Q
0027    50 0.000430 +-0.000050   SN   T   RL055   COMPOSITE Q
0027    51 0.001280 +-0.000130   SB   T   RL055   COMPOSITE Q
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0027     56 0.000370 +-0.000220   BA   T   RL055   COMPOSITE Q
0027     80 0.000070 +-0.000020   HG   T   RL055   COMPOSITE Q
0027     82 0.021780 +-0.002178   PB   T   RL055   COMPOSITE Q
0028     13 0.031710 +-0.003171   AL   T   RL056   COMPOSITE R
0028     14 0.117090 +-0.011709   SI   T   RL056   COMPOSITE R
0028     15 0.001030 +-0.000160   P    T   RL056   COMPOSITE R
0028     16 0.007010 +-0.000701   S    T   RL056   COMPOSITE R
0028     17 0.002120 +-0.000212   CL   T   RL056   COMPOSITE R
0028     19 0.011340 +-0.001134   K    T   RL056   COMPOSITE R
0028     20 0.173550 +-0.017355   CA   T   RL056   COMPOSITE R
0028     22 0.002140 +-0.000214   TI   T   RL056   COMPOSITE R
0028     23 0.000130 +-0.000013   V    T   RL056   COMPOSITE R
0028     24 0.000120 +-0.000012   CR   T   RL056   COMPOSITE R
0028     25 0.000660 +-0.000066   MN   T   RL056   COMPOSITE R
0028     26 0.022960 +-0.002296   FE   T   RL056   COMPOSITE R
0028     28 0.000080 +-0.000010   NI   T   RL056   COMPOSITE R
0028     29 0.001790 +-0.000179   CU   T   RL056   COMPOSITE R
0028     30 0.003520 +-0.000352   ZN   T   RL056   COMPOSITE R
0028     33 0.000700 +-0.000070   AS   T   RL056   COMPOSITE R
0028     34 0.000040 +-0.000004   SE   T   RL056   COMPOSITE R
0028     35 0.000100 +-0.000010   BR   T   RL056   COMPOSITE R
0028     38 0.000280 +-0.000028   SR   T   RL056   COMPOSITE R
0028     46 0.000070 +-0.000010   PD   T   RL056   COMPOSITE R
0028     47 0.000090 +-0.000020   AG   T   RL056   COMPOSITE R
0028     48 0.000330 +-0.000040   CD   T   RL056   COMPOSITE R
0028     49 0.000060 +-0.000020   IN   T   RL056   COMPOSITE R
0028     50 0.000130 +-0.000030   SN   T   RL056   COMPOSITE R
0028     51 0.000280 +-0.000060   SB   T   RL056   COMPOSITE R
0028     56 0.000000 +-0.000140   BA   T   RL056   COMPOSITE R
0028     80 0.000060 +-0.000010   HG   T   RL056   COMPOSITE R
0028     82 0.011450 +-0.001145   PB   T   RL056   COMPOSITE R
0029     13 0.056420 +-0.005642   AL   T   RL057   COMPOSITE S
0029     14 0.199480 +-0.019948   SI   T   RL057   COMPOSITE S
0029     15 0.001650 +-0.000165   P    T   RL057   COMPOSITE S
0029     16 0.008510 +-0.000890   S    T   RL057   COMPOSITE S
0029     17 0.000520 +-0.000100   CL   T   RL057   COMPOSITE S
0029     19 0.011080 +-0.001108   K    T   RL057   COMPOSITE S
0029     20 0.034930 +-0.003493   CA   T   RL057   COMPOSITE S
0029     22 0.003030 +-0.000303   TI   T   RL057   COMPOSITE S
0029     23 0.000220 +-0.000022   V    T   RL057   COMPOSITE S
0029     24 0.000300 +-0.000030   CR   T   RL057   COMPOSITE S
0029     25 0.001120 +-0.000112   MN   T   RL057   COMPOSITE S
0029     26 0.052620 +-0.005262   FE   T   RL057   COMPOSITE S
0029     28 0.000500 +-0.000050   NI   T   RL057   COMPOSITE S
0029     29 0.081170 +-0.008117   CU   T   RL057   COMPOSITE S
0029     30 0.026810 +-0.002681   ZN   T   RL057   COMPOSITE S
0029     33 0.001480 +-0.000148   AS   T   RL057   COMPOSITE S
0029     34 0.000060 +-0.000010   SE   T   RL057   COMPOSITE S
0029     35 0.000180 +-0.000018   BR   T   RL057   COMPOSITE S
0029     38 0.000300 +-0.000030   SR   T   RL057   COMPOSITE S
0029     46 0.000110 +-0.000020   PD   T   RL057   COMPOSITE S
0029     47 0.000240 +-0.000040   AG   T   RL057   COMPOSITE S
0029     48 0.000520 +-0.000070   CD   T   RL057   COMPOSITE S
0029     49 0.000260 +-0.000060   IN   T   RL057   COMPOSITE S
0029     50 0.000700 +-0.000080   SN   T   RL057   COMPOSITE S
0029     51 0.000680 +-0.000140   SB   T   RL057   COMPOSITE S
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0029     56 0.000200 +-0.000300   BA   T   RL057   COMPOSITE S
0029     80 0.000060 +-0.000020   HG   T   RL057   COMPOSITE S
0029     82 0.018230 +-0.001823   PB   T   RL057   COMPOSITE S
0030     13 0.139460 +-0.013946   AL   T   RL009   I-1
0030     14 0.316010 +-0.031601   SI   T   RL009   I-1
0030     15 0.000760 +-0.000076   P    T   RL009   I-1
0030     16 0.001020 +-0.000102   S    T   RL009   I-1
0030     17 0.000370 +-0.000040   CL   T   RL009   I-1
0030     19 0.001550 +-0.000155   K    T   RL009   I-1
0030     20 0.009990 +-0.000999   CA   T   RL009   I-1
0030     22 0.000750 +-0.000075   TI   T   RL009   I-1
0030     23 0.000080 +-0.000010   V    T   RL009   I-1
0030     24 0.000150 +-0.000015   CR   T   RL009   I-1
0030     25 0.000580 +-0.000058   MN   T   RL009   I-1
0030     26 0.023870 +-0.002387   FE   T   RL009   I-1
0030     28 0.000040 +-0.000010   NI   T   RL009   I-1
0030     29 0.000090 +-0.000010   CU   T   RL009   I-1
0030     30 0.000240 +-0.000024   ZN   T   RL009   I-1
0030     33 0.000030 +-0.000010   AS   T   RL009   I-1
0030     34 0.000000 +-0.000001   SE   T   RL009   I-1
0030     35 0.000000 +-0.000001   BR   T   RL009   I-1
0030     38 0.000100 +-0.000010   SR   T   RL009   I-1
0030     46 0.000060 +-0.000020   PD   T   RL009   I-1
0030     47 0.000000 +-0.000030   AG   T   RL009   I-1
0030     48 0.000000 +-0.000040   CD   T   RL009   I-1
0030     49 0.000000 +-0.000040   IN   T   RL009   I-1
0030     50 0.000110 +-0.000050   SN   T   RL009   I-1
0030     51 0.000060 +-0.000090   SB   T   RL009   I-1
0030     56 0.000000 +-0.000230   BA   T   RL009   I-1
0030     80 0.000020 +-0.000010   HG   T   RL009   I-1
0030     82 0.000130 +-0.000020   PB   T   RL009   I-1
0031     13 0.006290 +-0.000629   AL   T   RL010   I-2
0031     14 0.018540 +-0.001854   SI   T   RL010   I-2
0031     15 0.001340 +-0.000134   P    T   RL010   I-2
0031     16 0.016890 +-0.004460   S    T   RL010   I-2
0031     17 0.000000 +-0.000290   CL   T   RL010   I-2
0031     19 0.001250 +-0.000125   K    T   RL010   I-2
0031     20 0.017080 +-0.001708   CA   T   RL010   I-2
0031     22 0.000600 +-0.000060   TI   T   RL010   I-2
0031     23 0.000070 +-0.000010   V    T   RL010   I-2
0031     24 0.000160 +-0.000016   CR   T   RL010   I-2
0031     25 0.000780 +-0.000078   MN   T   RL010   I-2
0031     26 0.018040 +-0.001804   FE   T   RL010   I-2
0031     28 0.000730 +-0.000073   NI   T   RL010   I-2
0031     29 0.042710 +-0.004271   CU   T   RL010   I-2
0031     30 0.012550 +-0.001255   ZN   T   RL010   I-2
0031     33 0.011680 +-0.001168   AS   T   RL010   I-2
0031     34 0.000340 +-0.000034   SE   T   RL010   I-2
0031     35 0.001230 +-0.000123   BR   T   RL010   I-2
0031     38 0.000280 +-0.000030   SR   T   RL010   I-2
0031     46 0.000470 +-0.000047   PD   T   RL010   I-2
0031     47 0.001200 +-0.000120   AG   T   RL010   I-2
0031     48 0.002000 +-0.000200   CD   T   RL010   I-2
0031     49 0.000660 +-0.000070   IN   T   RL010   I-2
0031     50 0.004540 +-0.000454   SN   T   RL010   I-2
0031     51 0.008320 +-0.000832   SB   T   RL010   I-2
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0031     56 0.000520 +-0.000240    BA   T   RL010   I-2
0031     80 0.000050 +-0.000050    HG   T   RL010   I-2
0031     82 0.109350 +-0.010935    PB   T   RL010   I-2
0032     13 0.008300 +-0.000830    AL   T   RL011   I-3
0032     14 0.013700 +-0.001370    SI   T   RL011   I-3
0032     15 0.002540 +-0.000254    P    T   RL011   I-3
0032     16 0.044900 +-0.010460    S    T   RL011   I-3
0032     17 0.000000 +-0.000670    CL   T   RL011   I-3
0032     19 0.001570 +-0.000170    K    T   RL011   I-3
0032     20 0.184210 +-0.018421    CA   T   RL011   I-3
0032     22 0.000180 +-0.000070    TI   T   RL011   I-3
0032     23 0.000020 +-0.000020    V    T   RL011   I-3
0032     24 0.000250 +-0.000025    CR   T   RL011   I-3
0032     25 0.002150 +-0.000215    MN   T   RL011   I-3
0032     26 0.030120 +-0.003012    FE   T   RL011   I-3
0032     28 0.000640 +-0.000064    NI   T   RL011   I-3
0032     29 0.026940 +-0.002694    CU   T   RL011   I-3
0032     30 0.023170 +-0.002317    ZN   T   RL011   I-3
0032     33 0.000000 +-0.000640    AS   T   RL011   I-3
0032     34 0.000140 +-0.000050    SE   T   RL011   I-3
0032     35 0.000580 +-0.000060    BR   T   RL011   I-3
0032     38 0.001120 +-0.000112    SR   T   RL011   I-3
0032     46 0.001810 +-0.000181    PD   T   RL011   I-3
0032     47 0.001380 +-0.000138    AG   T   RL011   I-3
0032     48 0.005730 +-0.000573    CD   T   RL011   I-3
0032     49 0.000380 +-0.000050    IN   T   RL011   I-3
0032     50 0.002630 +-0.000263    SN   T   RL011   I-3
0032     51 0.003840 +-0.000384    SB   T   RL011   I-3
0032     56 0.001790 +-0.000250    BA   T   RL011   I-3
0032     80 0.000000 +-0.000100    HG   T   RL011   I-3
0032     82 0.256020 +-0.025602    PB   T   RL011   I-3
0033     13 0.022580 +-0.002258    AL   T   RL015   I-4
0033     14 0.026710 +-0.002671    SI   T   RL015   I-4
0033     15 0.010790 +-0.001079    P    T   RL015   I-4
0033     16 0.239310 +-0.023931    S    T   RL015   I-4
0033     17 0.000000 +-0.000740    CL   T   RL015   I-4
0033     19 0.000000 +-0.000080    K    T   RL015   I-4
0033     20 0.002840 +-0.000284    CA   T   RL015   I-4
0033     22 0.000060 +-0.000010    TI   T   RL015   I-4
0033     23 0.000000 +-0.000010    V    T   RL015   I-4
0033     24 0.000020 +-0.000010    CR   T   RL015   I-4
0033     25 0.000040 +-0.000010    MN   T   RL015   I-4
0033     26 0.002000 +-0.000200    FE   T   RL015   I-4
0033     28 0.000040 +-0.000010    NI   T   RL015   I-4
0033     29 0.000400 +-0.000040    CU   T   RL015   I-4
0033     30 0.000470 +-0.000047    ZN   T   RL015   I-4
0033     33 0.000090 +-0.000050    AS   T   RL015   I-4
0033     34 0.000010 +-0.000010    SE   T   RL015   I-4
0033     35 0.000030 +-0.000010    BR   T   RL015   I-4
0033     38 0.000050 +-0.000020    SR   T   RL015   I-4
0033     46 0.000130 +-0.000050    PD   T   RL015   I-4
0033     47 0.000000 +-0.000070    AG   T   RL015   I-4
0033     48 0.000170 +-0.000110    CD   T   RL015   I-4
0033     49 0.000060 +-0.000120    IN   T   RL015   I-4
0033     50 0.000010 +-0.000120    SN   T   RL015   I-4
0033     51 0.000270 +-0.000240    SB   T   RL015   I-4
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0033     56 0.000000 +-0.000630   BA   T   RL015   I-4
0033     80 0.000050 +-0.000020   HG   T   RL015   I-4
0033     82 0.001910 +-0.000191   PB   T   RL015   I-4
0034     13 0.010670 +-0.001067   AL   T   RL013   I-5
0034     14 0.028130 +-0.002813   SI   T   RL013   I-5
0034     15 0.000000 +-0.000290   P    T   RL013   I-5
0034     16 0.007430 +-0.000743   S    T   RL013   I-5
0034     17 0.004200 +-0.000420   CL   T   RL013   I-5
0034     19 0.000910 +-0.000220   K    T   RL013   I-5
0034     20 0.286430 +-0.028643   CA   T   RL013   I-5
0034     22 0.000460 +-0.000046   TI   T   RL013   I-5
0034     23 0.000040 +-0.000010   V    T   RL013   I-5
0034     24 0.000030 +-0.000003   CR   T   RL013   I-5
0034     25 0.000250 +-0.000025   MN   T   RL013   I-5
0034     26 0.004410 +-0.000441   FE   T   RL013   I-5
0034     28 0.000030 +-0.000010   NI   T   RL013   I-5
0034     29 0.000080 +-0.000010   CU   T   RL013   I-5
0034     30 0.000140 +-0.000014   ZN   T   RL013   I-5
0034     33 0.000060 +-0.000010   AS   T   RL013   I-5
0034     34 0.000000 +-0.000001   SE   T   RL013   I-5
0034     35 0.000020 +-0.000002   BR   T   RL013   I-5
0034     38 0.000220 +-0.000022   SR   T   RL013   I-5
0034     46 0.000050 +-0.000020   PD   T   RL013   I-5
0034     47 0.000030 +-0.000030   AG   T   RL013   I-5
0034     48 0.000090 +-0.000040   CD   T   RL013   I-5
0034     49 0.000000 +-0.000040   IN   T   RL013   I-5
0034     50 0.000000 +-0.000040   SN   T   RL013   I-5
0034     51 0.000020 +-0.000080   SB   T   RL013   I-5
0034     56 0.000000 +-0.000220   BA   T   RL013   I-5
0034     80 0.000020 +-0.000010   HG   T   RL013   I-5
0034     82 0.000510 +-0.000051   PB   T   RL013   I-5
0035     13 0.005030 +-0.000503   AL   T   RL014   I-7
0035     14 0.012200 +-0.001220   SI   T   RL014   I-7
0035     15 0.004570 +-0.000457   P    T   RL014   I-7
0035     16 0.078950 +-0.013230   S    T   RL014   I-7
0035     17 0.002290 +-0.000890   CL   T   RL014   I-7
0035     19 0.003160 +-0.000450   K    T   RL014   I-7
0035     20 0.003080 +-0.000308   CA   T   RL014   I-7
0035     22 0.000300 +-0.000030   TI   T   RL014   I-7
0035     23 0.000100 +-0.000010   V    T   RL014   I-7
0035     24 0.000270 +-0.000027   CR   T   RL014   I-7
0035     25 0.000310 +-0.000031   MN   T   RL014   I-7
0035     26 0.006880 +-0.000688   FE   T   RL014   I-7
0035     28 0.000690 +-0.000069   NI   T   RL014   I-7
0035     29 0.010460 +-0.001046   CU   T   RL014   I-7
0035     30 0.142400 +-0.014240   ZN   T   RL014   I-7
0035     33 0.036220 +-0.003622   AS   T   RL014   I-7
0035     34 0.000680 +-0.000080   SE   T   RL014   I-7
0035     35 0.004190 +-0.000419   BR   T   RL014   I-7
0035     38 0.000160 +-0.000070   SR   T   RL014   I-7
0035     46 0.002710 +-0.000271   PD   T   RL014   I-7
0035     47 0.001320 +-0.000132   AG   T   RL014   I-7
0035     48 0.117000 +-0.011700   CD   T   RL014   I-7
0035     49 0.001390 +-0.000139   IN   T   RL014   I-7
0035     50 0.005150 +-0.000515   SN   T   RL014   I-7
0035     51 0.004070 +-0.000450   SB   T   RL014   I-7
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0035     56 0.001330 +-0.000420   BA   T   RL014   I-7
0035     80 0.000330 +-0.000130   HG   T   RL014   I-7
0035     82 0.321470 +-0.032147   PB   T   RL014   I-7
0036     13 0.011820 +-0.001182   AL   T   RL016   I-8
0036     14 0.034810 +-0.003481   SI   T   RL016   I-8
0036     15 0.004340 +-0.000434   P    T   RL016   I-8
0036     16 0.091240 +-0.011630   S    T   RL016   I-8
0036     17 0.000000 +-0.000740   CL   T   RL016   I-8
0036     19 0.002890 +-0.000289   K    T   RL016   I-8
0036     20 0.040390 +-0.004039   CA   T   RL016   I-8
0036     22 0.000750 +-0.000100   TI   T   RL016   I-8
0036     23 0.000070 +-0.000030   V    T   RL016   I-8
0036     24 0.000420 +-0.000042   CR   T   RL016   I-8
0036     25 0.003610 +-0.000361   MN   T   RL016   I-8
0036     26 0.064140 +-0.006414   FE   T   RL016   I-8
0036     28 0.000680 +-0.000068   NI   T   RL016   I-8
0036     29 0.021150 +-0.002115   CU   T   RL016   I-8
0036     30 0.045470 +-0.004547   ZN   T   RL016   I-8
0036     33 0.021410 +-0.002141   AS   T   RL016   I-8
0036     34 0.000670 +-0.000070   SE   T   RL016   I-8
0036     35 0.003040 +-0.000304   BR   T   RL016   I-8
0036     38 0.001600 +-0.000160   SR   T   RL016   I-8
0036     46 0.001900 +-0.000190   PD   T   RL016   I-8
0036     47 0.002900 +-0.000290   AG   T   RL016   I-8
0036     48 0.009610 +-0.000961   CD   T   RL016   I-8
0036     49 0.000590 +-0.000070   IN   T   RL016   I-8
0036     50 0.003630 +-0.000363   SN   T   RL016   I-8
0036     51 0.019550 +-0.001955   SB   T   RL016   I-8
0036     56 0.002890 +-0.000340   BA   T   RL016   I-8
0036     80 0.001230 +-0.000130   HG   T   RL016   I-8
0036     82 0.264370 +-0.026437   PB   T   RL016   I-8
0037     13 0.000620 +-0.000070   AL   T   RL017   I-9
0037     14 0.001740 +-0.000174   SI   T   RL017   I-9
0037     15 0.000100 +-0.000020   P    T   RL017   I-9
0037     16 0.002150 +-0.000360   S    T   RL017   I-9
0037     17 0.000000 +-0.000040   CL   T   RL017   I-9
0037     19 0.000140 +-0.000040   K    T   RL017   I-9
0037     20 0.001390 +-0.000139   CA   T   RL017   I-9
0037     22 0.000040 +-0.000010   TI   T   RL017   I-9
0037     23 0.000010 +-0.000001   V    T   RL017   I-9
0037     24 0.000030 +-0.000003   CR   T   RL017   I-9
0037     25 0.000100 +-0.000010   MN   T   RL017   I-9
0037     26 0.002060 +-0.000206   FE   T   RL017   I-9
0037     28 0.000020 +-0.000002   NI   T   RL017   I-9
0037     29 0.000820 +-0.000082   CU   T   RL017   I-9
0037     30 0.002290 +-0.000229   ZN   T   RL017   I-9
0037     33 0.000630 +-0.000063   AS   T   RL017   I-9
0037     34 0.000020 +-0.000010   SE   T   RL017   I-9
0037     35 0.000080 +-0.000010   BR   T   RL017   I-9
0037     38 0.000040 +-0.000010   SR   T   RL017   I-9
0037     46 0.000050 +-0.000020   PD   T   RL017   I-9
0037     47 0.000070 +-0.000030   AG   T   RL017   I-9
0037     48 0.000550 +-0.000060   CD   T   RL017   I-9
0037     49 0.000070 +-0.000040   IN   T   RL017   I-9
0037     50 0.000140 +-0.000050   SN   T   RL017   I-9
0037     51 0.000570 +-0.000110   SB   T   RL017   I-9
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0037     56 0.000000 +-0.000230   BA   T   RL017   I-9
0037     80 0.000030 +-0.000010   HG   T   RL017   I-9
0037     82 0.008130 +-0.000813   PB   T   RL017   I-9
0038     13 0.002830 +-0.000283   AL   T   RL019   I-10
0038     14 0.003910 +-0.000391   SI   T   RL019   I-10
0038     15 0.001420 +-0.000142   P    T   RL019   I-10
0038     16 0.023280 +-0.003640   S    T   RL019   I-10
0038     17 0.003410 +-0.000350   CL   T   RL019   I-10
0038     19 0.005370 +-0.000537   K    T   RL019   I-10
0038     20 0.001190 +-0.000119   CA   T   RL019   I-10
0038     22 0.000330 +-0.000033   TI   T   RL019   I-10
0038     23 0.000120 +-0.000012   V    T   RL019   I-10
0038     24 0.000180 +-0.000018   CR   T   RL019   I-10
0038     25 0.000230 +-0.000023   MN   T   RL019   I-10
0038     26 0.004280 +-0.000428   FE   T   RL019   I-10
0038     28 0.001240 +-0.000124   NI   T   RL019   I-10
0038     29 0.006790 +-0.000679   CU   T   RL019   I-10
0038     30 0.699310 +-0.069931   ZN   T   RL019   I-10
0038     33 0.008630 +-0.000863   AS   T   RL019   I-10
0038     34 0.000320 +-0.000032   SE   T   RL019   I-10
0038     35 0.000900 +-0.000090   BR   T   RL019   I-10
0038     38 0.000080 +-0.000020   SR   T   RL019   I-10
0038     46 0.001440 +-0.000144   PD   T   RL019   I-10
0038     47 0.000460 +-0.000070   AG   T   RL019   I-10
0038     48 0.000800 +-0.000100   CD   T   RL019   I-10
0038     49 0.000490 +-0.000090   IN   T   RL019   I-10
0038     50 0.004880 +-0.000488   SN   T   RL019   I-10
0038     51 0.004130 +-0.000413   SB   T   RL019   I-10
0038     56 0.001180 +-0.000430   BA   T   RL019   I-10
0038     80 0.000760 +-0.000076   HG   T   RL019   I-10
0038     82 0.084610 +-0.008461   PB   T   RL019   I-10
0039     13 0.002180 +-0.000218   AL   T   RL018   I-11
0039     14 0.006050 +-0.000605   SI   T   RL018   I-11
0039     15 0.000500 +-0.000050   P    T   RL018   I-11
0039     16 0.001920 +-0.000192   S    T   RL018   I-11
0039     17 0.000680 +-0.000068   CL   T   RL018   I-11
0039     19 0.001090 +-0.000109   K    T   RL018   I-11
0039     20 0.003450 +-0.000345   CA   T   RL018   I-11
0039     22 0.000620 +-0.000062   TI   T   RL018   I-11
0039     23 0.000130 +-0.000013   V    T   RL018   I-11
0039     24 0.000200 +-0.000020   CR   T   RL018   I-11
0039     25 0.000200 +-0.000020   MN   T   RL018   I-11
0039     26 0.008730 +-0.000873   FE   T   RL018   I-11
0039     28 0.003070 +-0.000307   NI   T   RL018   I-11
0039     29 0.763220 +-0.076322   CU   T   RL018   I-11
0039     30 0.007230 +-0.000723   ZN   T   RL018   I-11
0039     33 0.000050 +-0.000020   AS   T   RL018   I-11
0039     34 0.000020 +-0.000002   SE   T   RL018   I-11
0039     35 0.000030 +-0.000003   BR   T   RL018   I-11
0039     38 0.000090 +-0.000010   SR   T   RL018   I-11
0039     46 0.000100 +-0.000020   PD   T   RL018   I-11
0039     47 0.000130 +-0.000020   AG   T   RL018   I-11
0039     48 0.000170 +-0.000030   CD   T   RL018   I-11
0039     49 0.000520 +-0.000052   IN   T   RL018   I-11
0039     50 0.001260 +-0.000126   SN   T   RL018   I-11
0039     51 0.000570 +-0.000080   SB   T   RL018   I-11
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0039     56 0.000000 +-0.000170   BA   T   RL018   I-11
0039     80 0.000070 +-0.000010   HG   T   RL018   I-11
0039     82 0.001200 +-0.000120   PB   T   RL018   I-11
0040     13 0.003010 +-0.000340   AL   T   RL020   I-12
0040     14 0.004270 +-0.000427   SI   T   RL020   I-12
0040     15 0.001380 +-0.000138   P    T   RL020   I-12
0040     16 0.022440 +-0.003380   S    T   RL020   I-12
0040     17 0.000000 +-0.000310   CL   T   RL020   I-12
0040     19 0.004940 +-0.000494   K    T   RL020   I-12
0040     20 0.002110 +-0.000211   CA   T   RL020   I-12
0040     22 0.000260 +-0.000030   TI   T   RL020   I-12
0040     23 0.000110 +-0.000020   V    T   RL020   I-12
0040     24 0.000160 +-0.000020   CR   T   RL020   I-12
0040     25 0.000260 +-0.000026   MN   T   RL020   I-12
0040     26 0.002330 +-0.000233   FE   T   RL020   I-12
0040     28 0.001360 +-0.000136   NI   T   RL020   I-12
0040     29 0.007090 +-0.000709   CU   T   RL020   I-12
0040     30 0.720320 +-0.072032   ZN   T   RL020   I-12
0040     33 0.007780 +-0.000778   AS   T   RL020   I-12
0040     34 0.000270 +-0.000030   SE   T   RL020   I-12
0040     35 0.000900 +-0.000090   BR   T   RL020   I-12
0040     38 0.000050 +-0.000030   SR   T   RL020   I-12
0040     46 0.000700 +-0.000110   PD   T   RL020   I-12
0040     47 0.000250 +-0.000110   AG   T   RL020   I-12
0040     48 0.000840 +-0.000170   CD   T   RL020   I-12
0040     49 0.000210 +-0.000170   IN   T   RL020   I-12
0040     50 0.003720 +-0.000372   SN   T   RL020   I-12
0040     51 0.003410 +-0.000480   SB   T   RL020   I-12
0040     56 0.001190 +-0.000850   BA   T   RL020   I-12
0040     80 0.000730 +-0.000090   HG   T   RL020   I-12
0040     82 0.078980 +-0.007898   PB   T   RL020   I-12
0041     13 0.030070 +-0.003007   AL   T   RL021   I-14
0041     14 0.076630 +-0.007663   SI   T   RL021   I-14
0041     15 0.001440 +-0.000144   P    T   RL021   I-14
0041     16 0.005960 +-0.000596   S    T   RL021   I-14
0041     17 0.000470 +-0.000070   CL   T   RL021   I-14
0041     19 0.001870 +-0.000187   K    T   RL021   I-14
0041     20 0.022290 +-0.002229   CA   T   RL021   I-14
0041     22 0.001810 +-0.000181   TI   T   RL021   I-14
0041     23 0.000100 +-0.000010   V    T   RL021   I-14
0041     24 0.000070 +-0.000010   CR   T   RL021   I-14
0041     25 0.000130 +-0.000013   MN   T   RL021   I-14
0041     26 0.010370 +-0.001037   FE   T   RL021   I-14
0041     28 0.000080 +-0.000010   NI   T   RL021   I-14
0041     29 0.010830 +-0.001083   CU   T   RL021   I-14
0041     30 0.004590 +-0.000459   ZN   T   RL021   I-14
0041     33 0.000230 +-0.000040   AS   T   RL021   I-14
0041     34 0.000010 +-0.000010   SE   T   RL021   I-14
0041     35 0.000020 +-0.000010   BR   T   RL021   I-14
0041     38 0.000050 +-0.000010   SR   T   RL021   I-14
0041     46 0.000000 +-0.000040   PD   T   RL021   I-14
0041     47 0.000040 +-0.000060   AG   T   RL021   I-14
0041     48 0.000120 +-0.000080   CD   T   RL021   I-14
0041     49 0.000000 +-0.000090   IN   T   RL021   I-14
0041     50 0.000000 +-0.000100   SN   T   RL021   I-14
0041     51 0.000000 +-0.000180   SB   T   RL021   I-14
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0041     56 0.000660  +-0.000480    BA   T   RL021   I-14
0041     80 0.000000  +-0.000010    HG   T   RL021   I-14
0041     82 0.002010  +-0.000201    PB   T   RL021   I-14
0042     13 0.011030  +-0.001103    AL   T   RL022   I-15
0042     14 0.020510  +-0.002051    SI   T   RL022   I-15
0042     15 0.004340  +-0.000434    P    T   RL022   I-15
0042     16 0.065760  +-0.006576    S    T   RL022   I-15
0042     17 0.000000  +-0.000220    CL   T   RL022   I-15
0042     19 0.000790  +-0.000079    K    T   RL022   I-15
0042     20 0.006080  +-0.000608    CA   T   RL022   I-15
0042     22 0.000320  +-0.000032    TI   T   RL022   I-15
0042     23 0.000560  +-0.000056    V    T   RL022   I-15
0042     24 0.000150  +-0.000020    CR   T   RL022   I-15
0042     25 0.000180  +-0.000020    MN   T   RL022   I-15
0042     26 0.006760  +-0.000676    FE   T   RL022   I-15
0042     28 0.000310  +-0.000031    NI   T   RL022   I-15
0042     29 0.003060  +-0.000306    CU   T   RL022   I-15
0042     30 0.004470  +-0.000447    ZN   T   RL022   I-15
0042     33 0.000800  +-0.000090    AS   T   RL022   I-15
0042     34 0.000030  +-0.000010    SE   T   RL022   I-15
0042     35 0.000080  +-0.000010    BR   T   RL022   I-15
0042     38 0.000090  +-0.000020    SR   T   RL022   I-15
0042     46 0.000000  +-0.000040    PD   T   RL022   I-15
0042     47 0.000000  +-0.000060    AG   T   RL022   I-15
0042     48 0.000660  +-0.000110    CD   T   RL022   I-15
0042     49 0.000000  +-0.000100    IN   T   RL022   I-15
0042     50 0.000000  +-0.000120    SN   T   RL022   I-15
0042     51 0.000000  +-0.000210    SB   T   RL022   I-15
0042     56 0.000030  +-0.000520    BA   T   RL022   I-15
0042     80 0.000000  +-0.000020    HG   T   RL022   I-15
0042     82 0.007420  +-0.000742    PB   T   RL022   I-15
0043     13 0.034170  +-0.003417    AL   T   RL023   I-16
0043     14 0.085640  +-0.008564    SI   T   RL023   I-16
0043     15 0.001610  +-0.000161    P    T   RL023   I-16
0043     16 0.005390  +-0.000539    S    T   RL023   I-16
0043     17 0.000390  +-0.000060    CL   T   RL023   I-16
0043     19 0.002040  +-0.000204    K    T   RL023   I-16
0043     20 0.022950  +-0.002295    CA   T   RL023   I-16
0043     22 0.001800  +-0.000180    TI   T   RL023   I-16
0043     23 0.000090  +-0.000010    V    T   RL023   I-16
0043     24 0.000110  +-0.000011    CR   T   RL023   I-16
0043     25 0.000140  +-0.000014    MN   T   RL023   I-16
0043     26 0.010280  +-0.001028    FE   T   RL023   I-16
0043     28 0.000050  +-0.000010    NI   T   RL023   I-16
0043     29 0.001400  +-0.000140    CU   T   RL023   I-16
0043     30 0.000770  +-0.000077    ZN   T   RL023   I-16
0043     33 0.000140  +-0.000030    AS   T   RL023   I-16
0043     34 0.000010  +-0.000010    SE   T   RL023   I-16
0043     35 0.000010  +-0.000010    BR   T   RL023   I-16
0043     38 0.000060  +-0.000010    SR   T   RL023   I-16
0043     46 0.000000  +-0.000030    PD   T   RL023   I-16
0043     47 0.000030  +-0.000040    AG   T   RL023   I-16
0043     48 0.000070  +-0.000060    CD   T   RL023   I-16
0043     49 0.000000  +-0.000070    IN   T   RL023   I-16
0043     50 0.000000  +-0.000080    SN   T   RL023   I-16
0043     51 0.000000  +-0.000150    SB   T   RL023   I-16
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0043     56 0.000000 +-0.000360   BA   T   RL023   I-16
0043     80 0.000000 +-0.000010   HG   T   RL023   I-16
0043     82 0.001710 +-0.000171   PB   T   RL023   I-16
0044     13 0.052730 +-0.005273   AL   T   RL024   I-17
0044     14 0.129560 +-0.012956   SI   T   RL024   I-17
0044     15 0.000970 +-0.000097   P    T   RL024   I-17
0044     16 0.005330 +-0.000533   S    T   RL024   I-17
0044     17 0.000860 +-0.000090   CL   T   RL024   I-17
0044     19 0.005190 +-0.000519   K    T   RL024   I-17
0044     20 0.044650 +-0.004465   CA   T   RL024   I-17
0044     22 0.001720 +-0.000172   TI   T   RL024   I-17
0044     23 0.000070 +-0.000020   V    T   RL024   I-17
0044     24 0.000100 +-0.000010   CR   T   RL024   I-17
0044     25 0.000100 +-0.000010   MN   T   RL024   I-17
0044     26 0.011090 +-0.001109   FE   T   RL024   I-17
0044     28 0.000010 +-0.000010   NI   T   RL024   I-17
0044     29 0.000490 +-0.000049   CU   T   RL024   I-17
0044     30 0.000410 +-0.000041   ZN   T   RL024   I-17
0044     33 0.000020 +-0.000030   AS   T   RL024   I-17
0044     34 0.000010 +-0.000010   SE   T   RL024   I-17
0044     35 0.000010 +-0.000010   BR   T   RL024   I-17
0044     38 0.000160 +-0.000020   SR   T   RL024   I-17
0044     46 0.000020 +-0.000050   PD   T   RL024   I-17
0044     47 0.000020 +-0.000060   AG   T   RL024   I-17
0044     48 0.000120 +-0.000100   CD   T   RL024   I-17
0044     49 0.000000 +-0.000110   IN   T   RL024   I-17
0044     50 0.000000 +-0.000120   SN   T   RL024   I-17
0044     51 0.000000 +-0.000220   SB   T   RL024   I-17
0044     56 0.001080 +-0.000560   BA   T   RL024   I-17
0044     80 0.000000 +-0.000020   HG   T   RL024   I-17
0044     82 0.000440 +-0.000050   PB   T   RL024   I-17
0045     13 0.075600 +-0.007560   AL   T   RL025   I-18
0045     14 0.210450 +-0.021045   SI   T   RL025   I-18
0045     15 0.001790 +-0.000179   P    T   RL025   I-18
0045     16 0.011640 +-0.001164   S    T   RL025   I-18
0045     17 0.000220 +-0.000060   CL   T   RL025   I-18
0045     19 0.009480 +-0.000948   K    T   RL025   I-18
0045     20 0.003330 +-0.000333   CA   T   RL025   I-18
0045     22 0.001890 +-0.000189   TI   T   RL025   I-18
0045     23 0.000100 +-0.000040   V    T   RL025   I-18
0045     24 0.000150 +-0.000015   CR   T   RL025   I-18
0045     25 0.000120 +-0.000012   MN   T   RL025   I-18
0045     26 0.018520 +-0.001852   FE   T   RL025   I-18
0045     28 0.000050 +-0.000010   NI   T   RL025   I-18
0045     29 0.000260 +-0.000026   CU   T   RL025   I-18
0045     30 0.000190 +-0.000019   ZN   T   RL025   I-18
0045     33 0.000030 +-0.000020   AS   T   RL025   I-18
0045     34 0.000000 +-0.000001   SE   T   RL025   I-18
0045     35 0.000000 +-0.000010   BR   T   RL025   I-18
0045     38 0.000360 +-0.000036   SR   T   RL025   I-18
0045     46 0.000000 +-0.000030   PD   T   RL025   I-18
0045     47 0.000000 +-0.000040   AG   T   RL025   I-18
0045     48 0.000040 +-0.000060   CD   T   RL025   I-18
0045     49 0.000000 +-0.000070   IN   T   RL025   I-18
0045     50 0.000000 +-0.000080   SN   T   RL025   I-18
0045     51 0.000000 +-0.000140   SB   T   RL025   I-18
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0045    56 0.001530 +-0.000380   BA  T  RL025  I-18
0045    80 0.000000 +-0.000010   HG  T  RL025  I-18
0045    82 0.000330 +-0.000033   PB  T  RL025  I-18
0046    13 0.073420 +-0.007342   AL  T  RL026  I-19
0046    14 0.206950 +-0.020695   SI  T  RL026  I-19
0046    15 0.001700 +-0.000170   P   T  RL026  I-19
0046    16 0.020380 +-0.002038   S   T  RL026  I-19
0046    17 0.000530 +-0.000100   CL  T  RL026  I-19
0046    19 0.008420 +-0.000842   K   T  RL026  I-19
0046    20 0.031030 +-0.003103   CA  T  RL026  I-19
0046    22 0.002970 +-0.000297   TI  T  RL026  I-19
0046    23 0.000120 +-0.000040   V   T  RL026  I-19
0046    24 0.000210 +-0.000021   CR  T  RL026  I-19
0046    25 0.001800 +-0.000180   MN  T  RL026  I-19
0046    26 0.039600 +-0.003960   FE  T  RL026  I-19
0046    28 0.000150 +-0.000015   NI  T  RL026  I-19
0046    29 0.001580 +-0.000158   CU  T  RL026  I-19
0046    30 0.013890 +-0.001389   ZN  T  RL026  I-19
0046    33 0.000850 +-0.000085   AS  T  RL026  I-19
0046    34 0.000040 +-0.000010   SE  T  RL026  I-19
0046    35 0.000090 +-0.000010   BR  T  RL026  I-19
0046    38 0.000850 +-0.000085   SR  T  RL026  I-19
0046    46 0.000000 +-0.000030   PD  T  RL026  I-19
0046    47 0.000090 +-0.000040   AG  T  RL026  I-19
0046    48 0.000280 +-0.000070   CD  T  RL026  I-19
0046    49 0.000030 +-0.000070   IN  T  RL026  I-19
0046    50 0.000110 +-0.000080   SN  T  RL026  I-19
0046    51 0.000000 +-0.000140   SB  T  RL026  I-19
0046    56 0.001760 +-0.000380   BA  T  RL026  I-19
0046    80 0.000040 +-0.000020   HG  T  RL026  I-19
0046    82 0.007920 +-0.000792   PB  T  RL026  I-19
0047    13 0.086380 +-0.008638   AL  T  RL035  I-20
0047    14 0.239640 +-0.023964   SI  T  RL035  I-20
0047    15 0.002600 +-0.000260   P   T  RL035  I-20
0047    16 0.007540 +-0.000754   S   T  RL035  I-20
0047    17 0.100950 +-0.010095   CL  T  RL035  I-20
0047    19 0.011910 +-0.001191   K   T  RL035  I-20
0047    20 0.023880 +-0.002388   CA  T  RL035  I-20
0047    22 0.003880 +-0.000388   TI  T  RL035  I-20
0047    23 0.000230 +-0.000023   V   T  RL035  I-20
0047    24 0.000250 +-0.000025   CR  T  RL035  I-20
0047    25 0.000890 +-0.000089   MN  T  RL035  I-20
0047    26 0.040590 +-0.004059   FE  T  RL035  I-20
0047    28 0.000080 +-0.000010   NI  T  RL035  I-20
0047    29 0.001510 +-0.000151   CU  T  RL035  I-20
0047    30 0.000520 +-0.000052   ZN  T  RL035  I-20
0047    33 0.000030 +-0.000020   AS  T  RL035  I-20
0047    34 0.000010 +-0.000001   SE  T  RL035  I-20
0047    35 0.000040 +-0.000010   BR  T  RL035  I-20
0047    38 0.000260 +-0.000026   SR  T  RL035  I-20
0047    46 0.000000 +-0.000020   PD  T  RL035  I-20
0047    47 0.000070 +-0.000030   AG  T  RL035  I-20
0047    48 0.000000 +-0.000050   CD  T  RL035  I-20
0047    49 0.000040 +-0.000050   IN  T  RL035  I-20
0047    50 0.000000 +-0.000050   SN  T  RL035  I-20
0047    51 0.000040 +-0.000090   SB  T  RL035  I-20
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0047     56 0.000050 +-0.000270   BA   T   RL035   I-20
0047     80 0.000010 +-0.000010   HG   T   RL035   I-20
0047     82 0.000490 +-0.000049   PB   T   RL035   I-20
0048     13 0.030410 +-0.003041   AL   T   RL031   II-2
0048     14 0.074830 +-0.007483   SI   T   RL031   II-2
0048     15 0.002720 +-0.000272   P    T   RL031   II-2
0048     16 0.038610 +-0.005060   S    T   RL031   II-2
0048     17 0.000000 +-0.000340   CL   T   RL031   II-2
0048     19 0.007320 +-0.000732   K    T   RL031   II-2
0048     20 0.007990 +-0.000799   CA   T   RL031   II-2
0048     22 0.003090 +-0.000309   TI   T   RL031   II-2
0048     23 0.000660 +-0.000066   V    T   RL031   II-2
0048     24 0.000990 +-0.000099   CR   T   RL031   II-2
0048     25 0.003710 +-0.000371   MN   T   RL031   II-2
0048     26 0.272910 +-0.027291   FE   T   RL031   II-2
0048     28 0.000860 +-0.000086   NI   T   RL031   II-2
0048     29 0.014860 +-0.001486   CU   T   RL031   II-2
0048     30 0.118580 +-0.011858   ZN   T   RL031   II-2
0048     33 0.005890 +-0.000589   AS   T   RL031   II-2
0048     34 0.000320 +-0.000032   SE   T   RL031   II-2
0048     35 0.000810 +-0.000081   BR   T   RL031   II-2
0048     38 0.000840 +-0.000084   SR   T   RL031   II-2
0048     46 0.000820 +-0.000082   PD   T   RL031   II-2
0048     47 0.001110 +-0.000111   AG   T   RL031   II-2
0048     48 0.003700 +-0.000370   CD   T   RL031   II-2
0048     49 0.000490 +-0.000060   IN   T   RL031   II-2
0048     50 0.001900 +-0.000190   SN   T   RL031   II-2
0048     51 0.003820 +-0.000382   SB   T   RL031   II-2
0048     56 0.001010 +-0.000300   BA   T   RL031   II-2
0048     80 0.000250 +-0.000050   HG   T   RL031   II-2
0048     82 0.114820 +-0.011482   PB   T   RL031   II-2
0049     13 0.002930 +-0.000293   AL   T   RL032   II-3
0049     14 0.008510 +-0.000851   SI   T   RL032   II-3
0049     15 0.000300 +-0.000030   P    T   RL032   II-3
0049     16 0.002240 +-0.000230   S    T   RL032   II-3
0049     17 0.000490 +-0.000070   CL   T   RL032   II-3
0049     19 0.001690 +-0.000169   K    T   RL032   II-3
0049     20 0.004570 +-0.000457   CA   T   RL032   II-3
0049     22 0.000400 +-0.000040   TI   T   RL032   II-3
0049     23 0.000150 +-0.000015   V    T   RL032   II-3
0049     24 0.000220 +-0.000022   CR   T   RL032   II-3
0049     25 0.000350 +-0.000035   MN   T   RL032   II-3
0049     26 0.014560 +-0.001456   FE   T   RL032   II-3
0049     28 0.002810 +-0.000281   NI   T   RL032   II-3
0049     29 0.709320 +-0.070932   CU   T   RL032   II-3
0049     30 0.008730 +-0.000873   ZN   T   RL032   II-3
0049     33 0.000160 +-0.000050   AS   T   RL032   II-3
0049     34 0.000020 +-0.000010   SE   T   RL032   II-3
0049     35 0.000070 +-0.000010   BR   T   RL032   II-3
0049     38 0.000130 +-0.000013   SR   T   RL032   II-3
0049     46 0.000000 +-0.000030   PD   T   RL032   II-3
0049     47 0.000100 +-0.000050   AG   T   RL032   II-3
0049     48 0.000160 +-0.000080   CD   T   RL032   II-3
0049     49 0.000280 +-0.000080   IN   T   RL032   II-3
0049     50 0.000310 +-0.000090   SN   T   RL032   II-3
0049     51 0.000410 +-0.000160   SB   T   RL032   II-3
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0049     56 0.000000 +-0.000420   BA   T   RL032   II-3
0049     80 0.000060 +-0.000020   HG   T   RL032   II-3
0049     82 0.003120 +-0.000312   PB   T   RL032   II-3
0050     13 0.019360 +-0.001936   AL   T   RL044   III-1
0050     14 0.033830 +-0.003383   SI   T   RL044   III-1
0050     15 0.001620 +-0.000162   P    T   RL044   III-1
0050     16 0.010410 +-0.001041   S    T   RL044   III-1
0050     17 0.000150 +-0.000110   CL   T   RL044   III-1
0050     19 0.001300 +-0.000130   K    T   RL044   III-1
0050     20 0.004310 +-0.000431   CA   T   RL044   III-1
0050     22 0.000780 +-0.000078   TI   T   RL044   III-1
0050     23 0.000090 +-0.000020   V    T   RL044   III-1
0050     24 0.000130 +-0.000020   CR   T   RL044   III-1
0050     25 0.000280 +-0.000028   MN   T   RL044   III-1
0050     26 0.025630 +-0.002563   FE   T   RL044   III-1
0050     28 0.000080 +-0.000020   NI   T   RL044   III-1
0050     29 0.007080 +-0.000708   CU   T   RL044   III-1
0050     30 0.004370 +-0.000437   ZN   T   RL044   III-1
0050     33 0.003890 +-0.000389   AS   T   RL044   III-1
0050     34 0.000030 +-0.000010   SE   T   RL044   III-1
0050     35 0.000320 +-0.000032   BR   T   RL044   III-1
0050     38 0.000120 +-0.000020   SR   T   RL044   III-1
0050     46 0.000000 +-0.000060   PD   T   RL044   III-1
0050     47 0.000000 +-0.000090   AG   T   RL044   III-1
0050     48 0.000350 +-0.000130   CD   T   RL044   III-1
0050     49 0.000130 +-0.000140   IN   T   RL044   III-1
0050     50 0.000400 +-0.000160   SN   T   RL044   III-1
0050     51 0.002870 +-0.000420   SB   T   RL044   III-1
0050     56 0.000000 +-0.000760   BA   T   RL044   III-1
0050     80 0.000030 +-0.000030   HG   T   RL044   III-1
0050     82 0.008690 +-0.000869   PB   T   RL044   III-1
0051     13 0.007350 +-0.000735   AL   T   RL040   III-3
0051     14 0.026130 +-0.002613   SI   T   RL040   III-3
0051     15 0.002330 +-0.000233   P    T   RL040   III-3
0051     16 0.037160 +-0.007340   S    T   RL040   III-3
0051     17 0.000000 +-0.000480   CL   T   RL040   III-3
0051     19 0.000740 +-0.000074   K    T   RL040   III-3
0051     20 0.012890 +-0.001289   CA   T   RL040   III-3
0051     22 0.000770 +-0.000077   TI   T   RL040   III-3
0051     23 0.000110 +-0.000011   V    T   RL040   III-3
0051     24 0.000220 +-0.000022   CR   T   RL040   III-3
0051     25 0.000360 +-0.000036   MN   T   RL040   III-3
0051     26 0.023660 +-0.002366   FE   T   RL040   III-3
0051     28 0.007550 +-0.000755   NI   T   RL040   III-3
0051     29 0.379190 +-0.037919   CU   T   RL040   III-3
0051     30 0.011090 +-0.001109   ZN   T   RL040   III-3
0051     33 0.064600 +-0.006460   AS   T   RL040   III-3
0051     34 0.000400 +-0.000050   SE   T   RL040   III-3
0051     35 0.005960 +-0.000596   BR   T   RL040   III-3
0051     38 0.000110 +-0.000040   SR   T   RL040   III-3
0051     46 0.002060 +-0.000206   PD   T   RL040   III-3
0051     47 0.005260 +-0.000526   AG   T   RL040   III-3
0051     48 0.003390 +-0.000339   CD   T   RL040   III-3
0051     49 0.000920 +-0.000092   IN   T   RL040   III-3
0051     50 0.006490 +-0.000649   SN   T   RL040   III-3
0051     51 0.036410 +-0.003641   SB   T   RL040   III-3
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0051      56 0.000380 +-0.000250   BA   T   RL040   III-3
0051      80 0.000240 +-0.000070   HG   T   RL040   III-3
0051      82 0.178800 +-0.017880   PB   T   RL040   III-3
0052      13 0.043620 +-0.004362   AL   T   RL042   IV-1
0052      14 0.170290 +-0.017029   SI   T   RL042   IV-1
0052      15 0.002300 +-0.000230   P    T   RL042   IV-1
0052      16 0.031120 +-0.003410   S    T   RL042   IV-1
0052      17 0.000000 +-0.000300   CL   T   RL042   IV-1
0052      19 0.007860 +-0.000786   K    T   RL042   IV-1
0052      20 0.047380 +-0.004738   CA   T   RL042   IV-1
0052      22 0.002920 +-0.000292   TI   T   RL042   IV-1
0052      23 0.000420 +-0.000042   V    T   RL042   IV-1
0052      24 0.000710 +-0.000071   CR   T   RL042   IV-1
0052      25 0.004600 +-0.000460   MN   T   RL042   IV-1
0052      26 0.140090 +-0.014009   FE   T   RL042   IV-1
0052      28 0.000550 +-0.000055   NI   T   RL042   IV-1
0052      29 0.038800 +-0.003880   CU   T   RL042   IV-1
0052      30 0.058680 +-0.005868   ZN   T   RL042   IV-1
0052      33 0.006550 +-0.000655   AS   T   RL042   IV-1
0052      34 0.000250 +-0.000030   SE   T   RL042   IV-1
0052      35 0.000800 +-0.000080   BR   T   RL042   IV-1
0052      38 0.000610 +-0.000061   SR   T   RL042   IV-1
0052      46 0.000000 +-0.000060   PD   T   RL042   IV-1
0052      47 0.000730 +-0.000120   AG   T   RL042   IV-1
0052      48 0.001900 +-0.000210   CD   T   RL042   IV-1
0052      49 0.000540 +-0.000160   IN   T   RL042   IV-1
0052      50 0.001740 +-0.000220   SN   T   RL042   IV-1
0052      51 0.003100 +-0.000450   SB   T   RL042   IV-1
0052      56 0.002050 +-0.000860   BA   T   RL042   IV-1
0052      80 0.000410 +-0.000070   HG   T   RL042   IV-1
0052      82 0.073380 +-0.007338   PB   T   RL042   IV-1
0053      13 0.034010 +-0.003401   AL   T   RL028   IV-2
0053      14 0.142720 +-0.014272   SI   T   RL028   IV-2
0053      15 0.001570 +-0.000157   P    T   RL028   IV-2
0053      16 0.016290 +-0.001650   S    T   RL028   IV-2
0053      17 0.001120 +-0.000160   CL   T   RL028   IV-2
0053      19 0.007880 +-0.000788   K    T   RL028   IV-2
0053      20 0.067250 +-0.006725   CA   T   RL028   IV-2
0053      22 0.002900 +-0.000290   TI   T   RL028   IV-2
0053      23 0.000360 +-0.000040   V    T   RL028   IV-2
0053      24 0.000990 +-0.000099   CR   T   RL028   IV-2
0053      25 0.006230 +-0.000623   MN   T   RL028   IV-2
0053      26 0.209800 +-0.020980   FE   T   RL028   IV-2
0053      28 0.000590 +-0.000059   NI   T   RL028   IV-2
0053      29 0.019230 +-0.001923   CU   T   RL028   IV-2
0053      30 0.104240 +-0.010424   ZN   T   RL028   IV-2
0053      33 0.007830 +-0.000783   AS   T   RL028   IV-2
0053      34 0.000110 +-0.000011   SE   T   RL028   IV-2
0053      35 0.000720 +-0.000072   BR   T   RL028   IV-2
0053      38 0.000680 +-0.000068   SR   T   RL028   IV-2
0053      46 0.000120 +-0.000030   PD   T   RL028   IV-2
0053      47 0.000480 +-0.000060   AG   T   RL028   IV-2
0053      48 0.000930 +-0.000100   CD   T   RL028   IV-2
0053      49 0.000160 +-0.000070   IN   T   RL028   IV-2
0053      50 0.000790 +-0.000100   SN   T   RL028   IV-2
0053      51 0.002530 +-0.000253   SB   T   RL028   IV-2
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0053     56 0.002550 +-0.000400   BA   T   RL028   IV-2
0053     80 0.000240 +-0.000030   HG   T   RL028   IV-2
0053     82 0.033040 +-0.003304   PB   T   RL028   IV-2
0054     13 0.032030 +-0.003203   AL   T   RL029   IV-3
0054     14 0.131090 +-0.013109   SI   T   RL029   IV-3
0054     15 0.002270 +-0.000227   P    T   RL029   IV-3
0054     16 0.030980 +-0.004040   S    T   RL029   IV-3
0054     17 0.000000 +-0.000280   CL   T   RL029   IV-3
0054     19 0.006070 +-0.000607   K    T   RL029   IV-3
0054     20 0.051040 +-0.005104   CA   T   RL029   IV-3
0054     22 0.002160 +-0.000216   TI   T   RL029   IV-3
0054     23 0.000290 +-0.000040   V    T   RL029   IV-3
0054     24 0.001190 +-0.000119   CR   T   RL029   IV-3
0054     25 0.007030 +-0.000703   MN   T   RL029   IV-3
0054     26 0.136820 +-0.013682   FE   T   RL029   IV-3
0054     28 0.000480 +-0.000048   NI   T   RL029   IV-3
0054     29 0.015260 +-0.001526   CU   T   RL029   IV-3
0054     30 0.089210 +-0.008921   ZN   T   RL029   IV-3
0054     33 0.005870 +-0.000587   AS   T   RL029   IV-3
0054     34 0.000230 +-0.000030   SE   T   RL029   IV-3
0054     35 0.000680 +-0.000068   BR   T   RL029   IV-3
0054     38 0.000420 +-0.000042   SR   T   RL029   IV-3
0054     46 0.000400 +-0.000050   PD   T   RL029   IV-3
0054     47 0.000720 +-0.000072   AG   T   RL029   IV-3
0054     48 0.002000 +-0.000200   CD   T   RL029   IV-3
0054     49 0.000280 +-0.000070   IN   T   RL029   IV-3
0054     50 0.001020 +-0.000110   SN   T   RL029   IV-3
0054     51 0.002210 +-0.000221   SB   T   RL029   IV-3
0054     56 0.002630 +-0.000380   BA   T   RL029   IV-3
0054     80 0.000450 +-0.000050   HG   T   RL029   IV-3
0054     82 0.092290 +-0.009229   PB   T   RL029   IV-3
0055     13 0.023490 +-0.002349   AL   T   RL030   IV-4
0055     14 0.125090 +-0.012509   SI   T   RL030   IV-4
0055     15 0.001830 +-0.000183   P    T   RL030   IV-4
0055     16 0.019670 +-0.001967   S    T   RL030   IV-4
0055     17 0.001120 +-0.000170   CL   T   RL030   IV-4
0055     19 0.006480 +-0.000648   K    T   RL030   IV-4
0055     20 0.092450 +-0.009245   CA   T   RL030   IV-4
0055     22 0.002570 +-0.000257   TI   T   RL030   IV-4
0055     23 0.000440 +-0.000050   V    T   RL030   IV-4
0055     24 0.001120 +-0.000112   CR   T   RL030   IV-4
0055     25 0.012780 +-0.001278   MN   T   RL030   IV-4
0055     26 0.213230 +-0.021323   FE   T   RL030   IV-4
0055     28 0.000480 +-0.000048   NI   T   RL030   IV-4
0055     29 0.011890 +-0.001189   CU   T   RL030   IV-4
0055     30 0.092030 +-0.009203   ZN   T   RL030   IV-4
0055     33 0.003250 +-0.000325   AS   T   RL030   IV-4
0055     34 0.000090 +-0.000010   SE   T   RL030   IV-4
0055     35 0.000340 +-0.000034   BR   T   RL030   IV-4
0055     38 0.001950 +-0.000195   SR   T   RL030   IV-4
0055     46 0.000180 +-0.000040   PD   T   RL030   IV-4
0055     47 0.000180 +-0.000040   AG   T   RL030   IV-4
0055     48 0.000550 +-0.000080   CD   T   RL030   IV-4
0055     49 0.000070 +-0.000070   IN   T   RL030   IV-4
0055     50 0.000620 +-0.000090   SN   T   RL030   IV-4
0055     51 0.002020 +-0.000210   SB   T   RL030   IV-4
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0055     56 0.003530 +-0.000420   BA   T   RL030   IV-4
0055     80 0.000140 +-0.000030   HG   T   RL030   IV-4
0055     82 0.035000 +-0.003500   PB   T   RL030   IV-4
0056     13 0.007050 +-0.000705   AL   T   RL064   COMPOSITE 0-A
0056     14 0.018700 +-0.001870   SI   T   RL064   COMPOSITE 0-A
0056     15 0.002270 +-0.000227   P    T   RL064   COMPOSITE 0-A
0056     16 0.045330 +-0.005960   S    T   RL064   COMPOSITE 0-A
0056     17 0.000000 +-0.000390   CL   T   RL064   COMPOSITE 0-A
0056     19 0.002200 +-0.000220   K    T   RL064   COMPOSITE 0-A
0056     20 0.007650 +-0.000765   CA   T   RL064   COMPOSITE 0-A
0056     22 0.000690 +-0.000069   TI   T   RL064   COMPOSITE 0-A
0056     23 0.000110 +-0.000011   V    T   RL064   COMPOSITE 0-A
0056     24 0.000180 +-0.000018   CR   T   RL064   COMPOSITE 0-A
0056     25 0.000650 +-0.000065   MN   T   RL064   COMPOSITE 0-A
0056     26 0.040290 +-0.004029   FE   T   RL064   COMPOSITE 0-A
0056     28 0.003910 +-0.000391   NI   T   RL064   COMPOSITE 0-A
0056     29 0.113180 +-0.011318   CU   T   RL064   COMPOSITE 0-A
0056     30 0.026170 +-0.002617   ZN   T   RL064   COMPOSITE 0-A
0056     33 0.003720 +-0.000440   AS   T   RL064   COMPOSITE 0-A
0056     34 0.000020 +-0.000030   SE   T   RL064   COMPOSITE 0-A
0056     35 0.000670 +-0.000067   BR   T   RL064   COMPOSITE 0-A
0056     38 0.000200 +-0.000030   SR   T   RL064   COMPOSITE 0-A
0056     46 0.000560 +-0.000056   PD   T   RL064   COMPOSITE 0-A
0056     47 0.000610 +-0.000061   AG   T   RL064   COMPOSITE 0-A
0056     48 0.003330 +-0.000333   CD   T   RL064   COMPOSITE 0-A
0056     49 0.000280 +-0.000060   IN   T   RL064   COMPOSITE 0-A
0056     50 0.001090 +-0.000109   SN   T   RL064   COMPOSITE 0-A
0056     51 0.004470 +-0.000447   SB   T   RL064   COMPOSITE 0-A
0056     56 0.000390 +-0.000290   BA   T   RL064   COMPOSITE 0-A
0056     80 0.000000 +-0.000060   HG   T   RL064   COMPOSITE 0-A
0056     82 0.138390 +-0.013839   PB   T   RL064   COMPOSITE 0-A
0057     13 0.000000 +-0.000420   AL   T   RL093   COMP 0-B
0057     14 0.008070 +-0.000807   SI   T   RL093   COMP 0-B
0057     15 0.002630 +-0.000263   P    T   RL093   COMP 0-B
0057     16 0.027690 +-0.007190   S    T   RL093   COMP 0-B
0057     17 0.011550 +-0.001155   CL   T   RL093   COMP 0-B
0057     19 0.013710 +-0.001371   K    T   RL093   COMP 0-B
0057     20 0.055870 +-0.005587   CA   T   RL093   COMP 0-B
0057     22 0.003120 +-0.000312   TI   T   RL093   COMP 0-B
0057     23 0.000000 +-0.000010   V    T   RL093   COMP 0-B
0057     24 0.000150 +-0.000015   CR   T   RL093   COMP 0-B
0057     25 0.000130 +-0.000013   MN   T   RL093   COMP 0-B
0057     26 0.001520 +-0.000152   FE   T   RL093   COMP 0-B
0057     28 0.000540 +-0.000054   NI   T   RL093   COMP 0-B
0057     29 0.003750 +-0.000375   CU   T   RL093   COMP 0-B
0057     30 0.094110 +-0.009411   ZN   T   RL093   COMP 0-B
0057     33 0.159920 +-0.015992   AS   T   RL093   COMP 0-B
0057     34 0.000660 +-0.000066   SE   T   RL093   COMP 0-B
0057     35 0.012350 +-0.001235   BR   T   RL093   COMP 0-B
0057     38 0.000160 +-0.000040   SR   T   RL093   COMP 0-B
0057     46 0.003540 +-0.000354   PD   T   RL093   COMP 0-B
0057     47 0.001090 +-0.000109   AG   T   RL093   COMP 0-B
0057     48 0.004540 +-0.000454   CD   T   RL093   COMP 0-B
0057     49 0.001570 +-0.000157   IN   T   RL093   COMP 0-B
0057     50 0.016620 +-0.001662   SN   T   RL093   COMP 0-B
0057     51 0.196310 +-0.019631   SB   T   RL093   COMP 0-B
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0057      56 0.000480 +-0.000300   BA   T   RL093   COMP  0-B
0057      80 0.000860 +-0.000090   HG   T   RL093   COMP  0-B
0057      82 0.176560 +-0.017656   PB   T   RL093   COMP  0-B
0058      13 0.013340 +-0.001334   AL   T   RL065   COMPOSITE  0-C
0058      14 0.076200 +-0.007620   SI   T   RL065   COMPOSITE  0-C
0058      15 0.002380 +-0.000238   P    T   RL065   COMPOSITE  0-C
0058      16 0.034470 +-0.005910   S    T   RL065   COMPOSITE  0-C
0058      17 0.000000 +-0.000380   CL   T   RL065   COMPOSITE  0-C
0058      19 0.003670 +-0.000367   K    T   RL065   COMPOSITE  0-C
0058      20 0.006460 +-0.000646   CA   T   RL065   COMPOSITE  0-C
0058      22 0.002110 +-0.000211   TI   T   RL065   COMPOSITE  0-C
0058      23 0.000320 +-0.000032   V    T   RL065   COMPOSITE  0-C
0058      24 0.000780 +-0.000078   CR   T   RL065   COMPOSITE  0-C
0058      25 0.007210 +-0.000721   MN   T   RL065   COMPOSITE  0-C
0058      26 0.211730 +-0.021173   FE   T   RL065   COMPOSITE  0-C
0058      28 0.000810 +-0.000081   NI   T   RL065   COMPOSITE  0-C
0058      29 0.010060 +-0.001006   CU   T   RL065   COMPOSITE  0-C
0058      30 0.138880 +-0.013888   ZN   T   RL065   COMPOSITE  0-C
0058      33 0.002090 +-0.000370   AS   T   RL065   COMPOSITE  0-C
0058      34 0.000120 +-0.000030   SE   T   RL065   COMPOSITE  0-C
0058      35 0.000460 +-0.000046   BR   T   RL065   COMPOSITE  0-C
0058      38 0.008150 +-0.000815   SR   T   RL065   COMPOSITE  0-C
0058      46 0.002170 +-0.000217   PD   T   RL065   COMPOSITE  0-C
0058      47 0.001580 +-0.000158   AG   T   RL065   COMPOSITE  0-C
0058      48 0.004510 +-0.000451   CD   T   RL065   COMPOSITE  0-C
0058      49 0.000620 +-0.000062   IN   T   RL065   COMPOSITE  0-C
0058      50 0.001450 +-0.000145   SN   T   RL065   COMPOSITE  0-C
0058      51 0.001680 +-0.000168   SB   T   RL065   COMPOSITE  0-C
0058      56 0.001750 +-0.000200   BA   T   RL065   COMPOSITE  0-C
0058      80 0.000080 +-0.000050   HG   T   RL065   COMPOSITE  0-C
0058      82 0.140520 +-0.014052   PB   T   RL065   COMPOSITE  0-C
0059      13 0.016890 +-0.001689   AL   T   RL066   COMPOSITE  0-D
0059      14 0.052310 +-0.005231   SI   T   RL066   COMPOSITE  0-D
0059      15 0.004720 +-0.000472   P    T   RL066   COMPOSITE  0-D
0059      16 0.152140 +-0.015214   S    T   RL066   COMPOSITE  0-D
0059      17 0.000000 +-0.000540   CL   T   RL066   COMPOSITE  0-D
0059      19 0.002320 +-0.000232   K    T   RL066   COMPOSITE  0-D
0059      20 0.005490 +-0.000549   CA   T   RL066   COMPOSITE  0-D
0059      22 0.001720 +-0.000172   TI   T   RL066   COMPOSITE  0-D
0059      23 0.000340 +-0.000034   V    T   RL066   COMPOSITE  0-D
0059      24 0.000670 +-0.000067   CR   T   RL066   COMPOSITE  0-D
0059      25 0.001370 +-0.000137   MN   T   RL066   COMPOSITE  0-D
0059      26 0.228640 +-0.022864   FE   T   RL066   COMPOSITE  0-D
0059      28 0.000670 +-0.000067   NI   T   RL066   COMPOSITE  0-D
0059      29 0.038370 +-0.003837   CU   T   RL066   COMPOSITE  0-D
0059      30 0.120310 +-0.012031   ZN   T   RL066   COMPOSITE  0-D
0059      33 0.002060 +-0.000300   AS   T   RL066   COMPOSITE  0-D
0059      34 0.000150 +-0.000020   SE   T   RL066   COMPOSITE  0-D
0059      35 0.000380 +-0.000038   BR   T   RL066   COMPOSITE  0-D
0059      38 0.000720 +-0.000072   SR   T   RL066   COMPOSITE  0-D
0059      46 0.001030 +-0.000103   PD   T   RL066   COMPOSITE  0-D
0059      47 0.002460 +-0.000246   AG   T   RL066   COMPOSITE  0-D
0059      48 0.001670 +-0.000167   CD   T   RL066   COMPOSITE  0-D
0059      49 0.000310 +-0.000050   IN   T   RL066   COMPOSITE  0-D
0059      50 0.001880 +-0.000188   SN   T   RL066   COMPOSITE  0-D
0059      51 0.001870 +-0.000187   SB   T   RL066   COMPOSITE  0-D
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0059     56 0.000530 +-0.000220   BA   T   RL066   COMPOSITE 0-D
0059     80 0.000090 +-0.000040   HG   T   RL066   COMPOSITE 0-D
0059     82 0.102400 +-0.010240   PB   T   RL066   COMPOSITE 0-D
0060     13 0.010030 +-0.001003   AL   T   RL067   COMPOSITE 0-E
0060     14 0.027640 +-0.002764   SI   T   RL067   COMPOSITE 0-E
0060     15 0.002860 +-0.000286   P    T   RL067   COMPOSITE 0-E
0060     16 0.063120 +-0.006312   S    T   RL067   COMPOSITE 0-E
0060     17 0.000000 +-0.000390   CL   T   RL067   COMPOSITE 0-E
0060     19 0.003870 +-0.000387   K    T   RL067   COMPOSITE 0-E
0060     20 0.042740 +-0.004274   CA   T   RL067   COMPOSITE 0-E
0060     22 0.001010 +-0.000101   TI   T   RL067   COMPOSITE 0-E
0060     23 0.000170 +-0.000020   V    T   RL067   COMPOSITE 0-E
0060     24 0.000560 +-0.000056   CR   T   RL067   COMPOSITE 0-E
0060     25 0.009670 +-0.000967   MN   T   RL067   COMPOSITE 0-E
0060     26 0.134010 +-0.013401   FE   T   RL067   COMPOSITE 0-E
0060     28 0.001390 +-0.000139   NI   T   RL067   COMPOSITE 0-E
0060     29 0.019530 +-0.001953   CU   T   RL067   COMPOSITE 0-E
0060     30 0.128370 +-0.012837   ZN   T   RL067   COMPOSITE 0-E
0060     33 0.001560 +-0.000340   AS   T   RL067   COMPOSITE 0-E
0060     34 0.000160 +-0.000030   SE   T   RL067   COMPOSITE 0-E
0060     35 0.000420 +-0.000042   BR   T   RL067   COMPOSITE 0-E
0060     38 0.006430 +-0.000643   SR   T   RL067   COMPOSITE 0-E
0060     46 0.002010 +-0.000201   PD   T   RL067   COMPOSITE 0-E
0060     47 0.002120 +-0.000212   AG   T   RL067   COMPOSITE 0-E
0060     48 0.005330 +-0.000533   CD   T   RL067   COMPOSITE 0-E
0060     49 0.000670 +-0.000067   IN   T   RL067   COMPOSITE 0-E
0060     50 0.004720 +-0.000472   SN   T   RL067   COMPOSITE 0-E
0060     51 0.000880 +-0.000100   SB   T   RL067   COMPOSITE 0-E
0060     56 0.003760 +-0.000376   BA   T   RL067   COMPOSITE 0-E
0060     80 0.000450 +-0.000060   HG   T   RL067   COMPOSITE 0-E
0060     82 0.129900 +-0.012990   PB   T   RL067   COMPOSITE 0-E
0061     13 0.126680 +-0.012668   AL   T   RL068   COMPOSITE 0-F
0061     14 0.238200 +-0.023820   SI   T   RL068   COMPOSITE 0-F
0061     15 0.001980 +-0.000198   P    T   RL068   COMPOSITE 0-F
0061     16 0.017860 +-0.001786   S    T   RL068   COMPOSITE 0-F
0061     17 0.000000 +-0.000140   CL   T   RL068   COMPOSITE 0-F
0061     19 0.031690 +-0.003169   K    T   RL068   COMPOSITE 0-F
0061     20 0.004600 +-0.000460   CA   T   RL068   COMPOSITE 0-F
0061     22 0.002500 +-0.000250   TI   T   RL068   COMPOSITE 0-F
0061     23 0.000200 +-0.000020   V    T   RL068   COMPOSITE 0-F
0061     24 0.000270 +-0.000027   CR   T   RL068   COMPOSITE 0-F
0061     25 0.005470 +-0.000547   MN   T   RL068   COMPOSITE 0-F
0061     26 0.072440 +-0.007244   FE   T   RL068   COMPOSITE 0-F
0061     28 0.000130 +-0.000013   NI   T   RL068   COMPOSITE 0-F
0061     29 0.004890 +-0.000489   CU   T   RL068   COMPOSITE 0-F
0061     30 0.008210 +-0.000821   ZN   T   RL068   COMPOSITE 0-F
0061     33 0.015350 +-0.001535   AS   T   RL068   COMPOSITE 0-F
0061     34 0.000050 +-0.000010   SE   T   RL068   COMPOSITE 0-F
0061     35 0.001290 +-0.000129   BR   T   RL068   COMPOSITE 0-F
0061     38 0.000220 +-0.000022   SR   T   RL068   COMPOSITE 0-F
0061     46 0.000060 +-0.000040   PD   T   RL068   COMPOSITE 0-F
0061     47 0.000420 +-0.000060   AG   T   RL068   COMPOSITE 0-F
0061     48 0.000210 +-0.000080   CD   T   RL068   COMPOSITE 0-F
0061     49 0.000110 +-0.000080   IN   T   RL068   COMPOSITE 0-F
0061     50 0.000000 +-0.000090   SN   T   RL068   COMPOSITE 0-F
0061     51 0.000320 +-0.000190   SB   T   RL068   COMPOSITE 0-F
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0061    56 0.000000 +-0.000420   BA   T   RL068   COMPOSITE  0-F
0061    80 0.000090 +-0.000030   HG   T   RL068   COMPOSITE  0-F
0061    82 0.030110 +-0.003011   PB   T   RL068   COMPOSITE  0-F
0062    13 0.039570 +-0.003957   AL   T   RL069   COMPOSITE  0-G
0062    14 0.101450 +-0.010145   SI   T   RL069   COMPOSITE  0-G
0062    15 0.004820 +-0.000482   P    T   RL069   COMPOSITE  0-G
0062    16 0.099520 +-0.011310   S    T   RL069   COMPOSITE  0-G
0062    17 0.000000 +-0.000710   CL   T   RL069   COMPOSITE  0-G
0062    19 0.006910 +-0.000691   K    T   RL069   COMPOSITE  0-G
0062    20 0.005580 +-0.000558   CA   T   RL069   COMPOSITE  0-G
0062    22 0.004220 +-0.000422   TI   T   RL069   COMPOSITE  0-G
0062    23 0.000330 +-0.000033   V    T   RL069   COMPOSITE  0-G
0062    24 0.000690 +-0.000069   CR   T   RL069   COMPOSITE  0-G
0062    25 0.018460 +-0.001846   MN   T   RL069   COMPOSITE  0-G
0062    26 0.160700 +-0.016070   FE   T   RL069   COMPOSITE  0-G
0062    28 0.000530 +-0.000053   NI   T   RL069   COMPOSITE  0-G
0062    29 0.014680 +-0.001468   CU   T   RL069   COMPOSITE  0-G
0062    30 0.046270 +-0.004627   ZN   T   RL069   COMPOSITE  0-G
0062    33 0.001860 +-0.000630   AS   T   RL069   COMPOSITE  0-G
0062    34 0.000130 +-0.000050   SE   T   RL069   COMPOSITE  0-G
0062    35 0.000670 +-0.000067   BR   T   RL069   COMPOSITE  0-G
0062    38 0.000170 +-0.000060   SR   T   RL069   COMPOSITE  0-G
0062    46 0.002410 +-0.000241   PD   T   RL069   COMPOSITE  0-G
0062    47 0.012470 +-0.001247   AG   T   RL069   COMPOSITE  0-G
0062    48 0.005260 +-0.000526   CD   T   RL069   COMPOSITE  0-G
0062    49 0.000490 +-0.000050   IN   T   RL069   COMPOSITE  0-G
0062    50 0.004020 +-0.000402   SN   T   RL069   COMPOSITE  0-G
0062    51 0.013870 +-0.001387   SB   T   RL069   COMPOSITE  0-G
0062    56 0.001480 +-0.000230   BA   T   RL069   COMPOSITE  0-G
0062    80 0.000000 +-0.000090   HG   T   RL069   COMPOSITE  0-G
0062    82 0.249760 +-0.024976   PB   T   RL069   COMPOSITE  0-G
0063    13 0.033040 +-0.003304   AL   T   RL070   COMPOSITE  0-H
0063    14 0.087860 +-0.008786   SI   T   RL070   COMPOSITE  0-H
0063    15 0.005750 +-0.000575   P    T   RL070   COMPOSITE  0-H
0063    16 0.141590 +-0.014159   S    T   RL070   COMPOSITE  0-H
0063    17 0.000000 +-0.000740   CL   T   RL070   COMPOSITE  0-H
0063    19 0.005190 +-0.000519   K    T   RL070   COMPOSITE  0-H
0063    20 0.020440 +-0.002044   CA   T   RL070   COMPOSITE  0-H
0063    22 0.002500 +-0.000250   TI   T   RL070   COMPOSITE  0-H
0063    23 0.000170 +-0.000020   V    T   RL070   COMPOSITE  0-H
0063    24 0.000330 +-0.000033   CR   T   RL070   COMPOSITE  0-H
0063    25 0.002010 +-0.000201   MN   T   RL070   COMPOSITE  0-H
0063    26 0.062970 +-0.006297   FE   T   RL070   COMPOSITE  0-H
0063    28 0.000800 +-0.000080   NI   T   RL070   COMPOSITE  0-H
0063    29 0.109360 +-0.010936   CU   T   RL070   COMPOSITE  0-H
0063    30 0.060130 +-0.006013   ZN   T   RL070   COMPOSITE  0-H
0063    33 0.074310 +-0.007431   AS   T   RL070   COMPOSITE  0-H
0063    34 0.000300 +-0.000050   SE   T   RL070   COMPOSITE  0-H
0063    35 0.006770 +-0.000677   BR   T   RL070   COMPOSITE  0-H
0063    38 0.000380 +-0.000060   SR   T   RL070   COMPOSITE  0-H
0063    46 0.001840 +-0.000184   PD   T   RL070   COMPOSITE  0-H
0063    47 0.007690 +-0.000769   AG   T   RL070   COMPOSITE  0-H
0063    48 0.003350 +-0.000335   CD   T   RL070   COMPOSITE  0-H
0063    49 0.000790 +-0.000090   IN   T   RL070   COMPOSITE  0-H
0063    50 0.002860 +-0.000286   SN   T   RL070   COMPOSITE  0-H
0063    51 0.093570 +-0.009357   SB   T   RL070   COMPOSITE  0-H
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0063     56 0.000800 +-0.000390   BA   T   RL070   COMPOSITE O-H
0063     80 0.000900 +-0.000110   HG   T   RL070   COMPOSITE O-H
0063     82 0.228420 +-0.022842   PB   T   RL070   COMPOSITE O-H
0064     13 0.018380 +-0.001838   AL   T   RL072   COMPOSITE O-I
0064     14 0.032750 +-0.003275   SI   T   RL072   COMPOSITE O-I
0064     15 0.006860 +-0.000686   P    T   RL072   COMPOSITE O-I
0064     16 0.131770 +-0.025960   S    T   RL072   COMPOSITE O-I
0064     17 0.000000 +-0.001650   CL   T   RL072   COMPOSITE O-I
0064     19 0.002240 +-0.000224   K    T   RL072   COMPOSITE O-I
0064     20 0.011280 +-0.001128   CA   T   RL072   COMPOSITE O-I
0064     22 0.000490 +-0.000130   TI   T   RL072   COMPOSITE O-I
0064     23 0.000040 +-0.000040   V    T   RL072   COMPOSITE O-I
0064     24 0.000340 +-0.000034   CR   T   RL072   COMPOSITE O-I
0064     25 0.000470 +-0.000047   MN   T   RL072   COMPOSITE O-I
0064     26 0.051880 +-0.005188   FE   T   RL072   COMPOSITE O-I
0064     28 0.002320 +-0.000232   NI   T   RL072   COMPOSITE O-I
0064     29 0.011900 +-0.001190   CU   T   RL072   COMPOSITE O-I
0064     30 0.013040 +-0.001304   ZN   T   RL072   COMPOSITE O-I
0064     33 0.000000 +-0.001560   AS   T   RL072   COMPOSITE O-I
0064     34 0.000030 +-0.000130   SE   T   RL072   COMPOSITE O-I
0064     35 0.000410 +-0.000120   BR   T   RL072   COMPOSITE O-I
0064     38 0.000040 +-0.000140   SR   T   RL072   COMPOSITE O-I
0064     46 0.003390 +-0.000339   PD   T   RL072   COMPOSITE O-I
0064     47 0.000830 +-0.000083   AG   T   RL072   COMPOSITE O-I
0064     48 0.008770 +-0.000877   CD   T   RL072   COMPOSITE O-I
0064     49 0.000700 +-0.000100   IN   T   RL072   COMPOSITE O-I
0064     50 0.004620 +-0.000462   SN   T   RL072   COMPOSITE O-I
0064     51 0.000000 +-0.000190   SB   T   RL072   COMPOSITE O-I
0064     56 0.002450 +-0.000460   BA   T   RL072   COMPOSITE O-I
0064     80 0.000000 +-0.000230   HG   T   RL072   COMPOSITE O-I
0064     82 0.625540 +-0.062554   PB   T   RL072   COMPOSITE O-I
0065     13 0.011530 +-0.001153   AL   T   RL073   O-J
0065     14 0.020660 +-0.002066   SI   T   RL073   O-J
0065     15 0.005500 +-0.000550   P    T   RL073   O-J
0065     16 0.154200 +-0.015420   S    T   RL073   O-J
0065     17 0.000000 +-0.000520   CL   T   RL073   O-J
0065     19 0.005300 +-0.000530   K    T   RL073   O-J
0065     20 0.036980 +-0.003698   CA   T   RL073   O-J
0065     22 0.003240 +-0.000324   TI   T   RL073   O-J
0065     23 0.000240 +-0.000024   V    T   RL073   O-J
0065     24 0.000580 +-0.000058   CR   T   RL073   O-J
0065     25 0.001790 +-0.000179   MN   T   RL073   O-J
0065     26 0.126030 +-0.012603   FE   T   RL073   O-J
0065     28 0.001310 +-0.000131   NI   T   RL073   O-J
0065     29 0.239030 +-0.023903   CU   T   RL073   O-J
0065     30 0.023280 +-0.002328   ZN   T   RL073   O-J
0065     33 0.022520 +-0.002252   AS   T   RL073   O-J
0065     34 0.000130 +-0.000020   SE   T   RL073   O-J
0065     35 0.002150 +-0.000215   BR   T   RL073   O-J
0065     38 0.000360 +-0.000036   SR   T   RL073   O-J
0065     46 0.000330 +-0.000060   PD   T   RL073   O-J
0065     47 0.026420 +-0.002642   AG   T   RL073   O-J
0065     48 0.001090 +-0.000120   CD   T   RL073   O-J
0065     49 0.000690 +-0.000110   IN   T   RL073   O-J
0065     50 0.004520 +-0.000452   SN   T   RL073   O-J
0065     51 0.155490 +-0.015549   SB   T   RL073   O-J
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0065     56 0.000490 +-0.000480   BA   T   RL073   0-J
0065     80 0.000420 +-0.000050   HG   T   RL073   0-J
0065     82 0.058740 +-0.005874   PB   T   RL073   0-J
0066     13 0.004570 +-0.000490   AL   T   RL075   0-K
0066     14 0.015020 +-0.001502   SI   T   RL075   0-K
0066     15 0.005520 +-0.000552   P    T   RL075   0-K
0066     16 0.119260 +-0.014570   S    T   RL075   0-K
0066     17 0.000000 +-0.000930   CL   T   RL075   0-K
0066     19 0.002790 +-0.000279   K    T   RL075   0-K
0066     20 0.054250 +-0.005425   CA   T   RL075   0-K
0066     22 0.000740 +-0.000074   TI   T   RL075   0-K
0066     23 0.000170 +-0.000017   V    T   RL075   0-K
0066     24 0.000230 +-0.000023   CR   T   RL075   0-K
0066     25 0.000280 +-0.000028   MN   T   RL075   0-K
0066     26 0.016420 +-0.001642   FE   T   RL075   0-K
0066     28 0.000670 +-0.000067   NI   T   RL075   0-K
0066     29 0.027180 +-0.002718   CU   T   RL075   0-K
0066     30 0.038720 +-0.003872   ZN   T   RL075   0-K
0066     33 0.092760 +-0.009276   AS   T   RL075   0-K
0066     34 0.001230 +-0.000123   SE   T   RL075   0-K
0066     35 0.007820 +-0.000782   BR   T   RL075   0-K
0066     38 0.000190 +-0.000070   SR   T   RL075   0-K
0066     46 0.003130 +-0.000313   PD   T   RL075   0-K
0066     47 0.002130 +-0.000213   AG   T   RL075   0-K
0066     48 0.012650 +-0.001265   CD   T   RL075   0-K
0066     49 0.000870 +-0.000100   IN   T   RL075   0-K
0066     50 0.010170 +-0.001017   SN   T   RL075   0-K
0066     51 0.024870 +-0.002487   SB   T   RL075   0-K
0066     56 0.001160 +-0.000390   BA   T   RL075   0-K
0066     80 0.000420 +-0.000130   HG   T   RL075   0-K
0066     82 0.331300 +-0.033130   PB   T   RL075   0-K
0067     13 0.009720 +-0.000972   AL   T   RL074   0-L
0067     14 0.020490 +-0.002049   SI   T   RL074   0-L
0067     15 0.004900 +-0.000490   P    T   RL074   0-L
0067     16 0.080100 +-0.019300   S    T   RL074   0-L
0067     17 0.000000 +-0.001260   CL   T   RL074   0-L
0067     19 0.001390 +-0.000139   K    T   RL074   0-L
0067     20 0.005890 +-0.000589   CA   T   RL074   0-L
0067     22 0.000490 +-0.000049   TI   T   RL074   0-L
0067     23 0.000200 +-0.000020   V    T   RL074   0-L
0067     24 0.000190 +-0.000020   CR   T   RL074   0-L
0067     25 0.000340 +-0.000034   MN   T   RL074   0-L
0067     26 0.010540 +-0.001054   FE   T   RL074   0-L
0067     28 0.001610 +-0.000161   NI   T   RL074   0-L
0067     29 0.039130 +-0.003913   CU   T   RL074   0-L
0067     30 0.006240 +-0.000624   ZN   T   RL074   0-L
0067     33 0.002300 +-0.001300   AS   T   RL074   0-L
0067     34 0.000200 +-0.000110   SE   T   RL074   0-L
0067     35 0.001220 +-0.000122   BR   T   RL074   0-L
0067     38 0.000000 +-0.000100   SR   T   RL074   0-L
0067     46 0.001030 +-0.000110   PD   T   RL074   0-L
0067     47 0.003520 +-0.000352   AG   T   RL074   0-L
0067     48 0.003660 +-0.000366   CD   T   RL074   0-L
0067     49 0.000440 +-0.000150   IN   T   RL074   0-L
0067     50 0.002110 +-0.000230   SN   T   RL074   0-L
0067     51 0.007870 +-0.000787   SB   T   RL074   0-L
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0067     56 0.001340 +-0.000770   BA   T   RL074   O-L
0067     80 0.000000 +-0.000190   HG   T   RL074   O-L
0067     82 0.465110 +-0.046511   PB   T   RL074   O-L
0068     13 0.011720 +-0.001172   AL   T   RL076   O-M
0068     14 0.026840 +-0.002684   SI   T   RL076   O-M
0068     15 0.005770 +-0.000577   P    T   RL076   O-M
0068     16 0.118770 +-0.018150   S    T   RL076   O-M
0068     17 0.000000 +-0.001150   CL   T   RL076   O-M
0068     19 0.001430 +-0.000143   K    T   RL076   O-M
0068     20 0.007880 +-0.000788   CA   T   RL076   O-M
0068     22 0.000420 +-0.000120   TI   T   RL076   O-M
0068     23 0.000090 +-0.000040   V    T   RL076   O-M
0068     24 0.000280 +-0.000028   CR   T   RL076   O-M
0068     25 0.001480 +-0.000148   MN   T   RL076   O-M
0068     26 0.034210 +-0.003421   FE   T   RL076   O-M
0068     28 0.001020 +-0.000102   NI   T   RL076   O-M
0068     29 0.086590 +-0.008659   CU   T   RL076   O-M
0068     30 0.070150 +-0.007015   ZN   T   RL076   O-M
0068     33 0.043820 +-0.004382   AS   T   RL076   O-M
0068     34 0.000480 +-0.000100   SE   T   RL076   O-M
0068     35 0.004640 +-0.000464   BR   T   RL076   O-M
0068     38 0.000130 +-0.000090   SR   T   RL076   O-M
0068     46 0.003270 +-0.000327   PD   T   RL076   O-M
0068     47 0.004280 +-0.000428   AG   T   RL076   O-M
0068     48 0.006750 +-0.000675   CD   T   RL076   O-M
0068     49 0.000840 +-0.000100   IN   T   RL076   O-M
0068     50 0.003700 +-0.000370   SN   T   RL076   O-M
0068     51 0.022910 +-0.002291   SB   T   RL076   O-M
0068     56 0.002070 +-0.000450   BA   T   RL076   O-M
0068     80 0.000270 +-0.000170   HG   T   RL076   O-M
0068     82 0.426820 +-0.042682   PB   T   RL076   O-M
0069     13 0.042650 +-0.004265   AL   T   RL077   O-N
0069     14 0.116910 +-0.011691   SI   T   RL077   O-N
0069     15 0.005410 +-0.000541   P    T   RL077   O-N
0069     16 0.087000 +-0.017430   S    T   RL077   O-N
0069     17 0.000000 +-0.001110   CL   T   RL077   O-N
0069     19 0.005570 +-0.000557   K    T   RL077   O-N
0069     20 0.005780 +-0.000578   CA   T   RL077   O-N
0069     22 0.001660 +-0.000166   TI   T   RL077   O-N
0069     23 0.000210 +-0.000021   V    T   RL077   O-N
0069     24 0.000280 +-0.000028   CR   T   RL077   O-N
0069     25 0.001570 +-0.000157   MN   T   RL077   O-N
0069     26 0.061140 +-0.006114   FE   T   RL077   O-N
0069     28 0.000570 +-0.000057   NI   T   RL077   O-N
0069     29 0.011090 +-0.001109   CU   T   RL077   O-N
0069     30 0.034800 +-0.003480   ZN   T   RL077   O-N
0069     33 0.019780 +-0.001978   AS   T   RL077   O-N
0069     34 0.000330 +-0.000090   SE   T   RL077   O-N
0069     35 0.002590 +-0.000259   BR   T   RL077   O-N
0069     38 0.000070 +-0.000090   SR   T   RL077   O-N
0069     46 0.003360 +-0.000336   PD   T   RL077   O-N
0069     47 0.004290 +-0.000429   AG   T   RL077   O-N
0069     48 0.006770 +-0.000677   CD   T   RL077   O-N
0069     49 0.000610 +-0.000080   IN   T   RL077   O-N
0069     50 0.003980 +-0.000398   SN   T   RL077   O-N
0069     51 0.020650 +-0.002065   SB   T   RL077   O-N
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0069      56 0.001300 +-0.000340   BA   T   RL077   O-H
0069      80 0.000000 +-0.000160   HG   T   RL077   O-H
0069      82 0.421420 +-0.042142   PB   T   RL077   O-H
0070      13 0.000500 +-0.000500   AL   T   HT288   D&L BLDG
0070      14 0.004600 +-0.001000   SI   T   HT288   D&L BLDG
0070      15 0.001200 +-0.000400   P    T   HT288   D&L BLDG
0070      16 0.010000 +-0.010000   S    T   HT288   D&L BLDG
0070      17 0.005000 +-0.005000   CL   T   HT288   D&L BLDG
0070      19 0.000500 +-0.000500   K    T   HT288   D&L BLDG
0070      20 0.005000 +-0.001000   CA   T   HT288   D&L BLDG
0070      22 0.000000 +-0.000040   TI   T   HT288   D&L BLDG
0070      23 0.000000 +-0.000010   V    T   HT288   D&L BLDG
0070      24 0.000170 +-0.000017   CR   T   HT288   D&L BLDG
0070      25 0.001200 +-0.000120   MN   T   HT288   D&L BLDG
0070      26 0.023440 +-0.002344   FE   T   HT288   D&L BLDG
0070      28 0.000610 +-0.000061   NI   T   HT288   D&L BLDG
0070      29 0.010070 +-0.001007   CU   T   HT288   D&L BLDG
0070      30 0.026880 +-0.002688   ZN   T   HT288   D&L BLDG
0070      33 0.049210 +-0.004921   AS   T   HT288   D&L BLDG
0070      34 0.001010 +-0.000101   SE   T   HT288   D&L BLDG
0070      35 0.001000 +-0.000500   BR   T   HT288   D&L BLDG
0070      38 0.000970 +-0.000097   SR   T   HT288   D&L BLDG
0070      46 0.007300 +-0.000730   PD   T   HT288   D&L BLDG
0070      47 0.003470 +-0.000347   AG   T   HT288   D&L BLDG
0070      48 0.037050 +-0.003705   CD   T   HT288   D&L BLDG
0070      49 0.000050 +-0.000010   IN   T   HT288   D&L BLDG
0070      50 0.007760 +-0.000776   SN   T   HT288   D&L BLDG
0070      51 0.017250 +-0.001725   SB   T   HT288   D&L BLDG
0070      56 0.002750 +-0.000275   BA   T   HT288   D&L BLDG
0070      80 0.001190 +-0.000130   HG   T   HT288   D&L BLDG
0070      82 0.314100 +-0.031410   PB   T   HT288   D&L BLDG
0071      13 0.005000 +-0.001000   AL   T   HT287   NEW DEAL BLDG
0071      14 0.015000 +-0.005000   SI   T   HT287   NEW DEAL BLDG
0071      15 0.003060 +-0.000306   P    T   HT287   NEW DEAL BLDG
0071      16 0.040000 +-0.010000   S    T   HT287   NEW DEAL BLDG
0071      17 0.001600 +-0.000400   CL   T   HT287   NEW DEAL BLDG
0071      19 0.003730 +-0.000373   K    T   HT287   NEW DEAL BLDG
0071      20 0.032900 +-0.003290   CA   T   HT287   NEW DEAL BLDG
0071      22 0.001010 +-0.000110   TI   T   HT287   NEW DEAL BLDG
0071      23 0.000200 +-0.000040   V    T   HT287   NEW DEAL BLDG
0071      24 0.001790 +-0.000179   CR   T   HT287   NEW DEAL BLDG
0071      25 0.004600 +-0.000460   MN   T   HT287   NEW DEAL BLDG
0071      26 0.091500 +-0.009150   FE   T   HT287   NEW DEAL BLDG
0071      28 0.000910 +-0.000091   NI   T   HT287   NEW DEAL BLDG
0071      29 0.025750 +-0.002575   CU   T   HT287   NEW DEAL BLDG
0071      30 0.066590 +-0.006659   ZN   T   HT287   NEW DEAL BLDG
0071      33 0.010970 +-0.001097   AS   T   HT287   NEW DEAL BLDG
0071      34 0.000500 +-0.000060   SE   T   HT287   NEW DEAL BLDG
0071      35 0.000400 +-0.000200   BR   T   HT287   NEW DEAL BLDG
0071      38 0.001760 +-0.000176   SR   T   HT287   NEW DEAL BLDG
0071      46 0.000950 +-0.000095   PD   T   HT287   NEW DEAL BLDG
0071      47 0.002390 +-0.000239   AG   T   HT287   NEW DEAL BLDG
0071      48 0.008340 +-0.000834   CD   T   HT287   NEW DEAL BLDG
0071      49 0.000100 +-0.000050   IN   T   HT287   NEW DEAL BLDG
0071      50 0.002240 +-0.000224   SN   T   HT287   NEW DEAL BLDG
0071      51 0.009790 +-0.000979   SB   T   HT287   NEW DEAL BLDG
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0071      56 0.001850 +-0.000360   BA   T   HT287   NEW DEAL BLDG
0071      80 0.000470 +-0.000100   HG   T   HT287   NEW DEAL BLDG
0071      82 0.228710 +-0.022871   PB   T   HT287   NEW DEAL BLDG
0072      13 0.010500 +-0.001050   AL   T   HT289   ZINC PLANT
0072      14 0.027180 +-0.002718   SI   T   HT289   ZINC PLANT
0072      15 0.000990 +-0.000099   P    T   HT289   ZINC PLANT
0072      16 0.004930 +-0.003710   S    T   HT289   ZINC PLANT
0072      17 0.000000 +-0.000250   CL   T   HT289   ZINC PLANT
0072      19 0.014150 +-0.001415   K    T   HT289   ZINC PLANT
0072      20 0.004890 +-0.000489   CA   T   HT289   ZINC PLANT
0072      22 0.000650 +-0.000065   TI   T   HT289   ZINC PLANT
0072      23 0.000090 +-0.000010   V    T   HT289   ZINC PLANT
0072      24 0.000130 +-0.000013   CR   T   HT289   ZINC PLANT
0072      25 0.000490 +-0.000049   MN   T   HT289   ZINC PLANT
0072      26 0.012260 +-0.001226   FE   T   HT289   ZINC PLANT
0072      28 0.000420 +-0.000042   NI   T   HT289   ZINC PLANT
0072      29 0.002560 +-0.000256   CU   T   HT289   ZINC PLANT
0072      30 0.181890 +-0.018189   ZN   T   HT289   ZINC PLANT
0072      33 0.004980 +-0.000498   AS   T   HT289   ZINC PLANT
0072      34 0.000190 +-0.000020   SE   T   HT289   ZINC PLANT
0072      35 0.000710 +-0.000071   BR   T   HT289   ZINC PLANT
0072      38 0.000260 +-0.000030   SR   T   HT289   ZINC PLANT
0072      46 0.001220 +-0.000122   PD   T   HT289   ZINC PLANT
0072      47 0.000450 +-0.000045   AG   T   HT289   ZINC PLANT
0072      48 0.001420 +-0.000142   CD   T   HT289   ZINC PLANT
0072      49 0.000300 +-0.000040   IN   T   HT289   ZINC PLANT
0072      50 0.003530 +-0.000353   SN   T   HT289   ZINC PLANT
0072      51 0.001490 +-0.000149   SB   T   HT289   ZINC PLANT
0072      56 0.000210 +-0.000160   BA   T   HT289   ZINC PLANT
0072      80 0.000130 +-0.000040   HG   T   HT289   ZINC PLANT
0072      82 0.090470 +-0.009047   PB   T   HT289   ZINC PLANT
0073      13 0.000300 +-0.000100   AL   T   HT292   DROSS BLDG
0073      14 0.002000 +-0.001000   SI   T   HT292   DROSS BLDG
0073      15 0.000350 +-0.000035   P    T   HT292   DROSS BLDG
0073      16 0.000000 +-0.005820   S    T   HT292   DROSS BLDG
0073      17 0.000000 +-0.000380   CL   T   HT292   DROSS BLDG
0073      19 0.000000 +-0.000030   K    T   HT292   DROSS BLDG
0073      20 0.007630 +-0.000763   CA   T   HT292   DROSS BLDG
0073      22 0.000160 +-0.000030   TI   T   HT292   DROSS BLDG
0073      23 0.000000 +-0.000010   V    T   HT292   DROSS BLDG
0073      24 0.000160 +-0.000016   CR   T   HT292   DROSS BLDG
0073      25 0.000240 +-0.000024   MN   T   HT292   DROSS BLDG
0073      26 0.007440 +-0.000744   FE   T   HT292   DROSS BLDG
0073      28 0.000860 +-0.000086   NI   T   HT292   DROSS BLDG
0073      29 0.028940 +-0.002894   CU   T   HT292   DROSS BLDG
0073      30 0.013580 +-0.001358   ZN   T   HT292   DROSS BLDG
0073      33 0.240000 +-0.030000   AS   T   HT292   DROSS BLDG
0073      34 0.000930 +-0.000093   SE   T   HT292   DROSS BLDG
0073      35 0.000070 +-0.000020   BR   T   HT292   DROSS BLDG
0073      38 0.000110 +-0.000030   SR   T   HT292   DROSS BLDG
0073      46 0.010900 +-0.001090   PD   T   HT292   DROSS BLDG
0073      47 0.004940 +-0.000494   AG   T   HT292   DROSS BLDG
0073      48 0.012190 +-0.001219   CD   T   HT292   DROSS BLDG
0073      49 0.002310 +-0.000231   IN   T   HT292   DROSS BLDG
0073      50 0.012420 +-0.001242   SN   T   HT292   DROSS BLDG
0073      51 0.027000 +-0.004000   SB   T   HT292   DROSS BLDG
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0073     56 0.001250 +-0.000140   BA   T   HT292   DROSS BLDG
0073     80 0.001040 +-0.000104   HG   T   HT292   DROSS BLDG
0073     82 0.134820 +-0.013482   PB   T   HT292   DROSS BLDG
0074     13 0.006000 +-0.002000   AL   T   HT297   ZINC BAGHOUSE
0074     14 0.020000 +-0.008000   SI   T   HT297   ZINC BAGHOUSE
0074     15 0.001900 +-0.000190   P    T   HT297   ZINC BAGHOUSE
0074     16 0.030410 +-0.005580   S    T   HT297   ZINC BAGHOUSE
0074     17 0.001500 +-0.000500   CL   T   HT297   ZINC BAGHOUSE
0074     19 0.008620 +-0.000862   K    T   HT297   ZINC BAGHOUSE
0074     20 0.005000 +-0.001000   CA   T   HT297   ZINC BAGHOUSE
0074     22 0.000820 +-0.000082   TI   T   HT297   ZINC BAGHOUSE
0074     23 0.000010 +-0.000010   V    T   HT297   ZINC BAGHOUSE
0074     24 0.000170 +-0.000020   CR   T   HT297   ZINC BAGHOUSE
0074     25 0.000300 +-0.000030   MN   T   HT297   ZINC BAGHOUSE
0074     26 0.010420 +-0.001042   FE   T   HT297   ZINC BAGHOUSE
0074     28 0.001150 +-0.000115   NI   T   HT297   ZINC BAGHOUSE
0074     29 0.006250 +-0.000625   CU   T   HT297   ZINC BAGHOUSE
0074     30 0.533040 +-0.053304   ZN   T   HT297   ZINC BAGHOUSE
0074     33 0.017770 +-0.001777   AS   T   HT297   ZINC BAGHOUSE
0074     34 0.000200 +-0.000040   SE   T   HT297   ZINC BAGHOUSE
0074     35 0.000080 +-0.000040   BR   T   HT297   ZINC BAGHOUSE
0074     38 0.000110 +-0.000040   SR   T   HT297   ZINC BAGHOUSE
0074     46 0.000800 +-0.000100   PD   T   HT297   ZINC BAGHOUSE
0074     47 0.000330 +-0.000080   AG   T   HT297   ZINC BAGHOUSE
0074     48 0.000700 +-0.000130   CD   T   HT297   ZINC BAGHOUSE
0074     49 0.000110 +-0.000030   IN   T   HT297   ZINC BAGHOUSE
0074     50 0.008610 +-0.000861   SN   T   HT297   ZINC BAGHOUSE
0074     51 0.007280 +-0.000728   SB   T   HT297   ZINC BAGHOUSE
0074     56 0.000000 +-0.000550   BA   T   HT297   ZINC BAGHOUSE
0074     80 0.000590 +-0.000090   HG   T   HT297   ZINC BAGHOUSE
0074     82 0.127800 +-0.012780   PB   T   HT297   ZINC BAGHOUSE
0075     13 0.000100 +-0.000050   AL   T   HT294   BLAST FURN UPS
0075     14 0.000300 +-0.000100   SI   T   HT294   BLAST FURN UPS
0075     15 0.006880 +-0.000688   P    T   HT294   BLAST FURN UPS
0075     16 0.140580 +-0.019010   S    T   HT294   BLAST FURN UPS
0075     17 0.040000 +-0.010000   CL   T   HT294   BLAST FURN UPS
0075     19 0.015100 +-0.001510   K    T   HT294   BLAST FURN UPS
0075     20 0.005000 +-0.001000   CA   T   HT294   BLAST FURN UPS
0075     22 0.000600 +-0.000060   TI   T   HT294   BLAST FURN UPS
0075     23 0.000000 +-0.000001   V    T   HT294   BLAST FURN UPS
0075     24 0.000230 +-0.000023   CR   T   HT294   BLAST FURN UPS
0075     25 0.000060 +-0.000020   MN   T   HT294   BLAST FURN UPS
0075     26 0.016240 +-0.001624   FE   T   HT294   BLAST FURN UPS
0075     28 0.000670 +-0.000067   NI   T   HT294   BLAST FURN UPS
0075     29 0.006770 +-0.000677   CU   T   HT294   BLAST FURN UPS
0075     30 0.061840 +-0.006184   ZN   T   HT294   BLAST FURN UPS
0075     33 0.028550 +-0.002855   AS   T   HT294   BLAST FURN UPS
0075     34 0.000740 +-0.000110   SE   T   HT294   BLAST FURN UPS
0075     35 0.001100 +-0.000300   BR   T   HT294   BLAST FURN UPS
0075     38 0.000620 +-0.000100   SR   T   HT294   BLAST FURN UPS
0075     46 0.001440 +-0.000144   PD   T   HT294   BLAST FURN UPS
0075     47 0.001170 +-0.000120   AG   T   HT294   BLAST FURN UPS
0075     48 0.102020 +-0.010202   CD   T   HT294   BLAST FURN UPS
0075     49 0.000300 +-0.000100   IN   T   HT294   BLAST FURN UPS
0075     50 0.003630 +-0.000363   SN   T   HT294   BLAST FURN UPS
0075     51 0.003990 +-0.000560   SB   T   HT294   BLAST FURN UPS
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0075      56 0.002130 +-0.000560   BA   T  HT294  BLAST FURN UPS
0075      80 0.000350 +-0.000180   HG   T  HT294  BLAST FURN UPS
0075      82 0.426870 +-0.042687   PB   T  HT294  BLAST FURN UPS
0076      13 0.009220 +-0.001803   AL   MAIN SINTER STACK DS
0076      14 0.031100 +-0.007071   SI   MAIN SINTER STACK DS
0076      15 0.007912 +-0.000791   P    MAIN SINTER STACK DS
0076      16 0.156673 +-0.015667   S    MAIN SINTER STACK DS
0076      17 0.009780 +-0.002693   CL   MAIN SINTER STACK DS
0076      19 0.008564 +-0.000856   K    MAIN SINTER STACK DS
0076      20 0.031280 +-0.005220   CA   MAIN SINTER STACK DS
0076      22 0.001765 +-0.000176   TI   MAIN SINTER STACK DS
0076      23 0.000053 +-0.000016   V    MAIN SINTER STACK DS
0076      24 0.000502 +-0.000070   CR   MAIN SINTER STACK DS
0076      25 0.004064 +-0.000640   MN   MAIN SINTER STACK DS
0076      26 0.062033 +-0.006203   FE   MAIN SINTER STACK DS
0076      28 0.000844 +-0.000094   NI   MAIN SINTER STACK DS
0076      29 0.016216 +-0.001622   CU   MAIN SINTER STACK DS
0076      30 0.045049 +-0.004505   ZN   MAIN SINTER STACK DS
0076      33 0.044974 +-0.004497   AS   MAIN SINTER STACK DS
0076      34 0.001193 +-0.000119   SE   MAIN SINTER STACK DS
0076      35 0.000756 +-0.000112   BR   MAIN SINTER STACK DS
0076      38 0.002121 +-0.000215   SR   MAIN SINTER STACK DS
0076      46 0.000306 +-0.000195   PD   MAIN SINTER STACK DS
0076      47 0.002434 +-0.000389   AG   MAIN SINTER STACK DS
0076      48 0.013140 +-0.001314   CD   MAIN SINTER STACK DS
0076      49 0.000150 +-0.000018   IN   MAIN SINTER STACK DS
0076      50 0.002107 +-0.000584   SN   MAIN SINTER STACK DS
0076      51 0.018401 +-0.001840   SB   MAIN SINTER STACK DS
0076      56 0.001722 +-0.002660   BA   MAIN SINTER STACK DS
0076      80 0.001654 +-0.000198   HG   MAIN SINTER STACK DS
0076      82 0.266738 +-0.026674   PB   MAIN SINTER STACK DS
0077      13 0.004500 +-0.000707   AL   ZINC STACK DSS
0077      14 0.013000 +-0.001803   SI   ZINC STACK DSS
0077      15 0.001685 +-0.000168   P    ZINC STACK DSS
0077      16 0.028112 +-0.002811   S    ZINC STACK DSS
0077      17 0.013500 +-0.002062   CL   ZINC STACK DSS
0077      19 0.005657 +-0.000566   K    ZINC STACK DSS
0077      20 0.002250 +-0.000707   CA   ZINC STACK DSS
0077      22 0.000277 +-0.000028   TI   ZINC STACK DSS
0077      23 0.000000 +-0.000001   V    ZINC STACK DSS
0077      24 0.000117 +-0.000012   CR   ZINC STACK DSS
0077      25 0.000040 +-0.000025   MN   ZINC STACK DSS
0077      26 0.002195 +-0.000219   FE   ZINC STACK DSS
0077      28 0.000995 +-0.000099   NI   ZINC STACK DSS
0077      29 0.002235 +-0.000223   CU   ZINC STACK DSS
0077      30 0.549312 +-0.054931   ZN   ZINC STACK DSS
0077      33 0.014492 +-0.001449   AS   ZINC STACK DSS
0077      34 0.000112 +-0.000018   SE   ZINC STACK DSS
0077      35 0.000057 +-0.000011   BR   ZINC STACK DSS
0077      38 0.000067 +-0.000022   SR   ZINC STACK DSS
0077      46 0.001117 +-0.000112   PD   ZINC STACK DSS
0077      47 0.000457 +-0.000067   AG   ZINC STACK DSS
0077      48 0.000785 +-0.000107   CD   ZINC STACK DSS
0077      49 0.000495 +-0.000064   IN   ZINC STACK DSS
0077      50 0.007037 +-0.000704   SN   ZINC STACK DSS
0077      51 0.005555 +-0.000555   SB   ZINC STACK DSS
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0077     56 0.000000 +-0.000537   BA   ZINC STACK DSS
0077     80 0.000632 +-0.000063   HG   ZINC STACK DSS
0077     82 0.080055 +-0.008005   PB   ZINC STACK DSS
0078     13 0.001000 +-0.000707   AL   BAGHOUSE STACK DSS
0078     14 0.002000 +-0.001414   SI   BAGHOUSE STACK DSS
0078     15 0.007582 +-0.000758   P    BAGHOUSE STACK DSS
0078     16 0.132554 +-0.013255   S    BAGHOUSE STACK DSS
0078     17 0.049490 +-0.004949   CL   BAGHOUSE STACK DSS
0078     19 0.020927 +-0.002093   K    BAGHOUSE STACK DSS
0078     20 0.005483 +-0.000548   CA   BAGHOUSE STACK DSS
0078     22 0.000289 +-0.000036   TI   BAGHOUSE STACK DSS
0078     23 0.000015 +-0.000007   V    BAGHOUSE STACK DSS
0078     24 0.000219 +-0.000032   CR   BAGHOUSE STACK DSS
0078     25 0.000072 +-0.000007   MN   BAGHOUSE STACK DSS
0078     26 0.001364 +-0.000136   FE   BAGHOUSE STACK DSS
0078     28 0.000591 +-0.000059   NI   BAGHOUSE STACK DSS
0078     29 0.003542 +-0.000354   CU   BAGHOUSE STACK DSS
0078     30 0.151660 +-0.015166   ZN   BAGHOUSE STACK DSS
0078     33 0.030980 +-0.003098   AS   BAGHOUSE STACK DSS
0078     34 0.000338 +-0.000064   SE   BAGHOUSE STACK DSS
0078     35 0.001283 +-0.000180   BR   BAGHOUSE STACK DSS
0078     38 0.000093 +-0.000065   SR   BAGHOUSE STACK DSS
0078     46 0.001711 +-0.000171   PD   BAGHOUSE STACK DSS
0078     47 0.001626 +-0.000214   AG   BAGHOUSE STACK DSS
0078     48 0.231298 +-0.023130   CD   BAGHOUSE STACK DSS
0078     49 0.000209 +-0.000052   IN   BAGHOUSE STACK DSS
0078     50 0.004978 +-0.000498   SN   BAGHOUSE STACK DSS
0078     51 0.001237 +-0.000822   SB   BAGHOUSE STACK DSS
0078     56 0.001845 +-0.001575   BA   BAGHOUSE STACK DSS
0078     80 0.000225 +-0.000119   HG   BAGHOUSE STACK DSS
0078     82 0.306657 +-0.030666   PB   BAGHOUSE STACK DSS
0079     13 0.004200 +-0.001000   AL   T   HT304   SLAG POUR
0079     14 0.019000 +-0.005000   SI   T   HT304   SLAG POUR
0079     15 0.002660 +-0.000266   P    T   HT304   SLAG POUR
0079     16 0.055230 +-0.005523   S    T   HT304   SLAG POUR
0079     17 0.000900 +-0.000200   CL   T   HT304   SLAG POUR
0079     19 0.041740 +-0.004174   K    T   HT304   SLAG POUR
0079     20 0.026000 +-0.004000   CA   T   HT304   SLAG POUR
0079     22 0.001040 +-0.000104   TI   T   HT304   SLAG POUR
0079     23 0.000010 +-0.000010   V    T   HT304   SLAG POUR
0079     24 0.000200 +-0.000030   CR   T   HT304   SLAG POUR
0079     25 0.001000 +-0.000300   MN   T   HT304   SLAG POUR
0079     26 0.037350 +-0.003735   FE   T   HT304   SLAG POUR
0079     28 0.000660 +-0.000070   NI   T   HT304   SLAG POUR
0079     29 0.003750 +-0.000375   CU   T   HT304   SLAG POUR
0079     30 0.324770 +-0.032477   ZN   T   HT304   SLAG POUR
0079     33 0.051960 +-0.005196   AS   T   HT304   SLAG POUR
0079     34 0.002080 +-0.000208   SE   T   HT304   SLAG POUR
0079     35 0.000040 +-0.000010   BR   T   HT304   SLAG POUR
0079     38 0.000520 +-0.000052   SR   T   HT304   SLAG POUR
0079     46 0.000100 +-0.000080   PD   T   HT304   SLAG POUR
0079     47 0.001300 +-0.000190   AG   T   HT304   SLAG POUR
0079     48 0.001590 +-0.000240   CD   T   HT304   SLAG POUR
0079     49 0.000110 +-0.000040   IN   T   HT304   SLAG POUR
0079     50 0.038490 +-0.003849   SN   T   HT304   SLAG POUR
0079     51 0.016260 +-0.001626   SB   T   HT304   SLAG POUR
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0079    56 0.000000 +-0.001020   BA   T   HT304   SLAG POUR
0079    80 0.000920 +-0.000110   HG   T   HT304   SLAG POUR
0079    82 0.031560 +-0.003156   PB   T   HT304   SLAG POUR
0080    13 0.003000 +-0.001000   AL   T   HT300   ZINC KILN RM
0080    14 0.009000 +-0.003000   SI   T   HT300   ZINC KILN RM
0080    15 0.001740 +-0.000174   P    T   HT300   ZINC KILN RM
0080    16 0.020290 +-0.003900   S    T   HT300   ZINC KILN RM
0080    17 0.007000 +-0.003000   CL   T   HT300   ZINC KILN RM
0080    19 0.006230 +-0.000623   K    T   HT300   ZINC KILN RM
0080    20 0.004400 +-0.000800   CA   T   HT300   ZINC KILN RM
0080    22 0.000530 +-0.000053   TI   T   HT300   ZINC KILN RM
0080    23 0.000000 +-0.000001   V    T   HT300   ZINC KILN RM
0080    24 0.000170 +-0.000030   CR   T   HT300   ZINC KILN RM
0080    25 0.000200 +-0.000070   MN   T   HT300   ZINC KILN RM
0080    26 0.007750 +-0.000775   FE   T   HT300   ZINC KILN RM
0080    28 0.001120 +-0.000112   NI   T   HT300   ZINC KILN RM
0080    29 0.004050 +-0.000405   CU   T   HT300   ZINC KILN RM
0080    30 0.621710 +-0.062171   ZN   T   HT300   ZINC KILN RM
0080    33 0.008250 +-0.000825   AS   T   HT300   ZINC KILN RM
0080    34 0.000850 +-0.000085   SE   T   HT300   ZINC KILN RM
0080    35 0.000100 +-0.000030   BR   T   HT300   ZINC KILN RM
0080    38 0.000140 +-0.000040   SR   T   HT300   ZINC KILN RM
0080    46 0.000340 +-0.000100   PD   T   HT300   ZINC KILN RM
0080    47 0.000390 +-0.000120   AG   T   HT300   ZINC KILN RM
0080    48 0.000920 +-0.000210   CD   T   HT300   ZINC KILN RM
0080    49 0.000180 +-0.000040   IN   T   HT300   ZINC KILN RM
0080    50 0.003120 +-0.000350   SN   T   HT300   ZINC KILN RM
0080    51 0.003620 +-0.000570   SB   T   HT300   ZINC KILN RM
0080    56 0.000830 +-0.000920   BA   T   HT300   ZINC KILN RM
0080    80 0.000500 +-0.000100   HG   T   HT300   ZINC KILN RM
0080    82 0.086970 +-0.008697   PB   T   HT300   ZINC KILN RM
0081    13 0.004230 +-0.000450   AL   T   HT301   ZINC KLN DISCH
0081    14 0.005740 +-0.000574   SI   T   HT301   ZINC KLN DISCH
0081    15 0.001880 +-0.000188   P    T   HT301   ZINC KLN DISCH
0081    16 0.032900 +-0.005160   S    T   HT301   ZINC KLN DISCH
0081    17 0.004270 +-0.000570   CL   T   HT301   ZINC KLN DISCH
0081    19 0.006150 +-0.000615   K    T   HT301   ZINC KLN DISCH
0081    20 0.002310 +-0.000231   CA   T   HT301   ZINC KLN DISCH
0081    22 0.000310 +-0.000031   TI   T   HT301   ZINC KLN DISCH
0081    23 0.000110 +-0.000020   V    T   HT301   ZINC KLN DISCH
0081    24 0.000180 +-0.000020   CR   T   HT301   ZINC KLN DISCH
0081    25 0.000210 +-0.000021   MN   T   HT301   ZINC KLN DISCH
0081    26 0.001880 +-0.000188   FE   T   HT301   ZINC KLN DISCH
0081    28 0.001060 +-0.000106   NI   T   HT301   ZINC KLN DISCH
0081    29 0.002540 +-0.000254   CU   T   HT301   ZINC KLN DISCH
0081    30 0.631820 +-0.063182   ZN   T   HT301   ZINC KLN DISCH
0081    33 0.011840 +-0.001184   AS   T   HT301   ZINC KLN DISCH
0081    34 0.003770 +-0.000377   SE   T   HT301   ZINC KLN DISCH
0081    35 0.001200 +-0.000120   BR   T   HT301   ZINC KLN DISCH
0081    38 0.000030 +-0.000040   SR   T   HT301   ZINC KLN DISCH
0081    46 0.000550 +-0.000110   PD   T   HT301   ZINC KLN DISCH
0081    47 0.000360 +-0.000100   AG   T   HT301   ZINC KLN DISCH
0081    48 0.000800 +-0.000180   CD   T   HT301   ZINC KLN DISCH
0081    49 0.000330 +-0.000160   IN   T   HT301   ZINC KLN DISCH
0081    50 0.004240 +-0.000424   SN   T   HT301   ZINC KLN DISCH
0081    51 0.003910 +-0.000530   SB   T   HT301   ZINC KLN DISCH
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0081     56 0.000000 +-0.000780   BA   T   HT301   ZINC KLN DISCH
0081     80 0.000640 +-0.000100   HG   T   HT301   ZINC KLN DISCH
0081     82 0.116640 +-0.011664   PB   T   HT301   ZINC KLN DISCH
0082     13 0.003470 +-0.000347   AL   T   HT305   CU KILN STACK
0082     14 0.003620 +-0.000362   SI   T   HT305   CU KILN STACK
0082     15 0.001930 +-0.000193   P    T   HT305   CU KILN STACK
0082     16 0.044880 +-0.004488   S    T   HT305   CU KILN STACK
0082     17 0.021160 +-0.002116   CL   T   HT305   CU KILN STACK
0082     19 0.002110 +-0.000211   K    T   HT305   CU KILN STACK
0082     20 0.007500 +-0.001000   CA   T   HT305   CU KILN STACK
0082     22 0.000180 +-0.000030   TI   T   HT305   CU KILN STACK
0082     23 0.000000 +-0.000001   V    T   HT305   CU KILN STACK
0082     24 0.000140 +-0.000020   CR   T   HT305   CU KILN STACK
0082     25 0.000010 +-0.000010   MN   T   HT305   CU KILN STACK
0082     26 0.001000 +-0.001000   FE   T   HT305   CU KILN STACK
0082     28 0.002030 +-0.000203   NI   T   HT305   CU KILN STACK
0082     29 0.541510 +-0.054151   CU   T   HT305   CU KILN STACK
0082     30 0.001270 +-0.000390   ZN   T   HT305   CU KILN STACK
0082     33 0.000000 +-0.000080   AS   T   HT305   CU KILN STACK
0082     34 0.000060 +-0.000020   SE   T   HT305   CU KILN STACK
0082     35 0.000180 +-0.000030   BR   T   HT305   CU KILN STACK
0082     38 0.000110 +-0.000020   SR   T   HT305   CU KILN STACK
0082     46 0.000110 +-0.000070   PD   T   HT305   CU KILN STACK
0082     47 0.000010 +-0.000010   AG   T   HT305   CU KILN STACK
0082     48 0.000880 +-0.000160   CD   T   HT305   CU KILN STACK
0082     49 0.000000 +-0.000001   IN   T   HT305   CU KILN STACK
0082     50 0.000090 +-0.000180   SN   T   HT305   CU KILN STACK
0082     51 0.000030 +-0.000010   SB   T   HT305   CU KILN STACK
0082     56 0.000130 +-0.000830   BA   T   HT305   CU KILN STACK
0082     80 0.000060 +-0.000040   HG   T   HT305   CU KILN STACK
0082     82 0.002340 +-0.000234   PB   T   HT305   CU KILN STACK
0083     13 0.000100 +-0.000040   AL   T   HT319   HT319
0083     14 0.000090 +-0.000030   SI   T   HT319   HT319
0083     15 0.000100 +-0.000020   P    T   HT319   HT319
0083     16 0.001150 +-0.000115   S    T   HT319   HT319
0083     17 0.000040 +-0.000020   CL   T   HT319   HT319
0083     19 0.000000 +-0.000010   K    T   HT319   HT319
0083     20 0.000000 +-0.000010   CA   T   HT319   HT319
0083     22 0.000000 +-0.000001   TI   T   HT319   HT319
0083     23 0.000000 +-0.000001   V    T   HT319   HT319
0083     24 0.000000 +-0.000001   CR   T   HT319   HT319
0083     25 0.000000 +-0.000001   MN   T   HT319   HT319
0083     26 0.000000 +-0.000010   FE   T   HT319   HT319
0083     28 0.000000 +-0.000001   NI   T   HT319   HT319
0083     29 0.000710 +-0.000071   CU   T   HT319   HT319
0083     30 0.000000 +-0.000001   ZN   T   HT319   HT319
0083     33 0.000000 +-0.000010   AS   T   HT319   HT319
0083     34 0.000000 +-0.000001   SE   T   HT319   HT319
0083     35 0.000000 +-0.000001   BR   T   HT319   HT319
0083     38 0.000000 +-0.000001   SR   T   HT319   HT319
0083     46 0.000000 +-0.000010   PD   T   HT319   HT319
0083     47 0.000020 +-0.000020   AG   T   HT319   HT319
0083     48 0.000000 +-0.000020   CD   T   HT319   HT319
0083     49 0.000000 +-0.000030   IN   T   HT319   HT319
0083     50 0.000000 +-0.000030   SN   T   HT319   HT319
0083     51 0.000000 +-0.000060   SB   T   HT319   HT319
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0083      56 0.000000 +-0.000150   BA   T   HT319   HT319
0083      80 0.000000 +-0.000001   HG   T   HT319   HT319
0083      82 0.000000 +-0.000010   PB   T   HT319   HT319
0084      13 0.008050 +-0.001150   AL   T   RL041   II-1
0084      14 0.016310 +-0.001631   SI   T   RL041   II-1
0084      15 0.004440 +-0.000444   P    T   RL041   II-1
0084      16 0.012620 +-0.001410   S    T   RL041   II-1
0084      17 0.000710 +-0.000420   CL   T   RL041   II-1
0084      19 0.002710 +-0.000550   K    T   RL041   II-1
0084      20 0.002360 +-0.000250   CA   T   RL041   II-1
0084      22 0.000230 +-0.000080   TI   T   RL041   II-1
0084      23 0.000060 +-0.000050   V    T   RL041   II-1
0084      24 0.000000 +-0.000060   CR   T   RL041   II-1
0084      25 0.000120 +-0.000070   MN   T   RL041   II-1
0084      26 0.003020 +-0.000340   FE   T   RL041   II-1
0084      28 0.000120 +-0.000070   NI   T   RL041   II-1
0084      29 0.004960 +-0.000496   CU   T   RL041   II-1
0084      30 0.003880 +-0.000388   ZN   T   RL041   II-1
0084      33 0.000700 +-0.000230   AS   T   RL041   II-1
0084      34 0.000000 +-0.000050   SE   T   RL041   II-1
0084      35 0.000360 +-0.000080   BR   T   RL041   II-1
0084      38 0.000100 +-0.000100   SR   T   RL041   II-1
0084      46 0.000000 +-0.000340   PD   T   RL041   II-1
0084      47 0.000400 +-0.000480   AG   T   RL041   II-1
0084      48 0.000000 +-0.000770   CD   T   RL041   II-1
0084      49 0.000040 +-0.000720   IN   T   RL041   II-1
0084      50 0.000000 +-0.000860   SN   T   RL041   II-1
0084      51 0.001190 +-0.001570   SB   T   RL041   II-1
0084      56 0.000000 +-0.004300   BA   T   RL041   II-1
0084      80 0.000000 +-0.000100   HG   T   RL041   II-1
0084      82 0.004460 +-0.000446   PB   T   RL041   II-1
0085      16 0.243000 +-0.024300   S    T   SECONDARY SULFATE
0087      13 0.022378 +-0.020728  AL    ORCOM   WEIGHTED AVERAGE OF OR
0087      14 0.055806 +-0.045098  SI    ORCOM   WEIGHTED AVERAGE OF OR
0087      15 0.004955 +-0.001206  P     ORCOM   WEIGHTED AVERAGE OF OR
0087      16 0.107148 +-0.040693  S     ORCOM   WEIGHTED AVERAGE OF OR
0087      17 0.000289 +-0.001826  CL    ORCOM   WEIGHTED AVERAGE OF OR
0087      19 0.004414 +-0.005040  K     ORCOM   WEIGHTED AVERAGE OF OR
0087      20 0.014789 +-0.012394  CA    ORCOM   WEIGHTED AVERAGE OF OR
0087      22 0.001669 +-0.001094  TI    ORCOM   WEIGHTED AVERAGE OF OR
0087      23 0.000188 +-0.000077  V     ORCOM   WEIGHTED AVERAGE OF OR
0087      24 0.000347 +-0.000175  CR    ORCOM   WEIGHTED AVERAGE OF OR
0087      25 0.002107 +-0.003243  MN    ORCOM   WEIGHTED AVERAGE OF OR
0087      26 0.070438 +-0.064660  FE    ORCOM   WEIGHTED AVERAGE OF OR
0087      28 0.001247 +-0.000793  NI    ORCOM   WEIGHTED AVERAGE OF OR
0087      29 0.073122 +-0.062161  CU    ORCOM   WEIGHTED AVERAGE OF OR
0087      30 0.046469 +-0.039106  ZN    ORCOM   WEIGHTED AVERAGE OF OR
0087      33 0.030739 +-0.037555  AS    ORCOM   WEIGHTED AVERAGE OF OR
0087      34 0.000224 +-0.000131  SE    ORCOM   WEIGHTED AVERAGE OF OR
0087      35 0.003152 +-0.002990  BR    ORCOM   WEIGHTED AVERAGE OF OR
0087      38 0.000586 +-0.001584  SR    ORCOM   WEIGHTED AVERAGE OF OR
0087      46 0.001649 +-0.000977  PD    ORCOM   WEIGHTED AVERAGE OF OR
0087      47 0.006103 +-0.006477  AG    ORCOM   WEIGHTED AVERAGE OF OR
0087      48 0.003820 +-0.001904  CD    ORCOM   WEIGHTED AVERAGE OF OR
0087      49 0.000610 +-0.000251  IN    ORCOM   WEIGHTED AVERAGE OF OR
0087      50 0.003134 +-0.002452  SN    ORCOM   WEIGHTED AVERAGE OF OR
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0087     51 0.047229 +-0.055683  SB    ORCOM  WEIGHTED AVERAGE OF ORE
0087     56 0.001129 +-0.000707  BA    ORCOM  WEIGHTED AVERAGE OF ORE
0087     80 0.000336 +-0.000394  HG    ORCOM  WEIGHTED AVERAGE OF ORE
0087     82 0.289958 +-0.166987  PB    ORCOM  WEIGHTED AVERAGE OF ORE
0088     13 0.002110 +-0.000170  AL  T   HT415   WOOD STOVE
0088     14 0.002510 +-0.000150  SI  T   HT415   WOOD STOVE
0088     15 0.001340 +-0.000080  P   T   HT415   WOOD STOVE
0088     16 0.008100 +-0.000440  S   T   HT415   WOOD STOVE
0088     17 0.002840 +-0.000170  CL  T   HT415   WOOD STOVE
0088     19 0.032520 +-0.001650  K   T   HT415   WOOD STOVE
0088     20 0.010980 +-0.000560  CA  T   HT415   WOOD STOVE
0088     22 0.000080 +-0.000010  TI  T   HT415   WOOD STOVE
0088     23 0.000010 +-0.000010  V   T   HT415   WOOD STOVE
0088     24 0.000000 +-0.000010  CR  T   HT415   WOOD STOVE
0088     25 0.000070 +-0.000010  MN  T   HT415   WOOD STOVE
0088     26 0.000150 +-0.000020  FE  T   HT415   WOOD STOVE
0088     28 0.000010 +-0.000010  NI  T   HT415   WOOD STOVE
0088     29 0.000010 +-0.000010  CU  T   HT415   WOOD STOVE
0088     30 0.001180 +-0.000060  ZN  T   HT415   WOOD STOVE
0088     33 0.000200 +-0.000020  AS  T   HT415   WOOD STOVE
0088     34 0.000000 +-0.000010  SE  T   HT415   WOOD STOVE
0088     35 0.000040 +-0.000010  BR  T   HT415   WOOD STOVE
0088     38 0.000060 +-0.000010  SR  T   HT415   WOOD STOVE
0088     46 0.000020 +-0.000020  PD  T   HT415   WOOD STOVE
0088     47 0.000000 +-0.000030  AG  T   HT415   WOOD STOVE
0088     48 0.000000 +-0.000050  CD  T   HT415   WOOD STOVE
0088     49 0.000020 +-0.000050  IN  T   HT415   WOOD STOVE
0088     50 0.000000 +-0.000060  SN  T   HT415   WOOD STOVE
0088     51 0.000000 +-0.000110  SB  T   HT415   WOOD STOVE
0088     56 0.000000 +-0.000280  BA  T   HT415   WOOD STOVE
0088     80 0.000000 +-0.000010  HG  T   HT415   WOOD STOVE
0088     82 0.000080 +-0.000020  PB  T   HT415   WOOD STOVE
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Wilson Jones. Made in U S A

C447-13 Redi-Cover

C447-13R	RED	[illegible]
C447-13BK	BLACK	[illegible]
C447-13DB	DARK BLUE	[illegible]
C447-13LB	LIGHT BLUE	[illegible]
C447-13Y	YELLOW	[illegible]